THE IRON AGE

New York, January 25, 1923

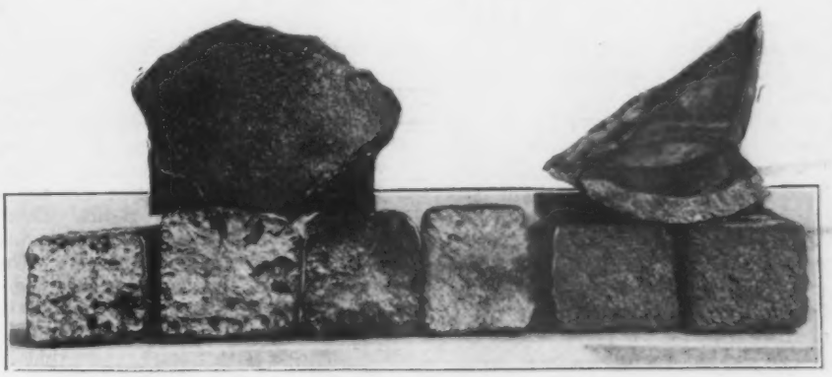
ESTABLISHED 1855 VOL. 111, No. 4

Gray Iron Castings from Electric Furnace

Possibility of Their Commercial Production—Acid and Basic Practice Compared—Rôle of Heat Treatment

BY LARRY J. BARTON*

FROM time to time in different technical journals articles have appeared discussing electric furnace gray iron in one form or another—some advocating and some opposing, some recommending acid operation, some basic—but as we scan the lists of manufacturers in this country of basic or acid electric iron casting we note very few who specialize in this work. There are several companies which are using the duplex process in conjunction with the cupola and there are several who are making intermittent heats of gray iron. From my personal knowledge I know of many shops which have attempted to make gray iron castings in the electric furnace, but, for some reason or other, have discontinued this product. The following article covers the attempts leading up to the successful manufacture of electric furnace gray iron castings as developed by the writer in a prominent California shop. It covers the actual development and experimentation in detail and leaves conclusions to the reader.



FRACTURES OF GRAY IRON MADE FROM STEEL SCRAP

From left to right: 1—Preliminary test taken as soon as bath was melted; note the blowy condition; this test will show about 2.60 per cent carbon. 2—The bath has been vigorously boiled; note the clearer white to the fracture; carbon about 3 per cent. 3—After several more boilings, note the freedom of blowy spots and the closer grain, radiating from the center; carbon over 3.25 per cent. 4—After addition of about 0.75 per cent silicon, structure mottled; note "fiery" appearance in the corners of test piece, showing satisfactory carbon; carbon here about 3.50 per cent. 5 and 6—After further additions of silicon, while slag is being brought to the finished condition. Piece above is from test spoon.

Upper piece to the left is taken from a final casting poured against a partial chill. Note the open grain and soft structure to the left where slow cooling was allowed. The final analysis was over 3.60 per cent carbon on this heat.

About a year and a half ago a new plant was started to make electric furnace iron castings. As time went on they made many gray iron castings, but had great difficulty in obtaining a soft iron. There was only one way to make a free cutting, soft gray iron and that was by using a large percentage of pig iron in the charge. This, however, proved so expensive that it had to be abandoned. It was about this time that the writer was called in.

The furnace at this time was operating on an acid bottom, and it was decided to make the trial first with the furnace in this condition. The first heat was charged with iron borings, sufficient ground coke being added to overcome any small oxidation of carbon. The borings were clean and had been taken from a miscellaneous grade of iron castings probably analyzing about 3.50 per cent carbon, 0.60 per cent manganese, 0.40 per cent phosphorus, 0.08 per cent sulphur, and 2.25 per cent silicon. The heat was melted down under ordinary acid conditions. As soon as the bath was in a molten condition a test was taken and poured into a sand mold, where it was allowed to remain until black, when it was quenched and broken. The fracture was rather close grained, such as would give a hard iron, especially in small sized castings. To the furnace was then added 0.50 per cent silicon, the bath boiled with a green rod and another test taken and treated as above. This test showed a soft gray iron and the heat was poured. Castings from this heat machined easily, but were prone to have hard spots scattered over the different faces at irregular intervals.

The above method was tried out several times, each time using the greatest care in the melting and finishing. From this series of melts the following facts were learned:

Great trouble was experienced with the slags, the carbon tending to reduce the hearth and the silicon again oxidizing to form a heavy slag. It was always necessary to slag off this heavy blanket several times during the course of a heat.

It was absolutely impossible to regulate the silicon contents in the metal, due to the above cause. Some heats would melt down fine while others would reduce at times as much as 1 per cent silicon.

Difficulty was always experienced in keeping the carbon contents up causing great trouble with hard irons, even

*Foundry manager, Bancroft & Ross, New Orleans.

though the silicons were from 2.25 to 3 per cent. This often gave rise to hard spots in the castings, causing undue rejections. The addition of extra amounts of coal or coke did not seem to overcome this point.

Heats were spotty, one giving good iron and the next giving a hard iron, even though both were melted in exactly the same way, and using the same class of melting stock.

Use of Gray Iron or Steel Scrap

Our next set of experiments covered the melting down of common gray iron scrap. As this was so costly we did not attempt this as a commercial possibility, but merely to obtain data to see if the results differed from borings. The heats were charged and melted in a similar manner. With this, results were better and iron was obtained which was soft and reasonably free from hard spots. Some difficulty was experienced with the slags, but not nearly so much as with the borings. We attributed this to the fact that the carbon was in combination until in a molten condition, no coke being added to the bottom. We also found that as soon as the heat was melted the silica started to reduce at the expense of the carbon giving some low carbon heats. The iron was dirty and difficulty was experienced with sand and slag spots in the castings. Aside from the high cost this, however, was considered as a feasible method of operation.

Our third step in this direction was the making of gray iron from steel scrap, principally borings and turnings. Coke or coal was charged in sufficient amounts to give the necessary carbon, and the charge was melted. Tests were taken and coke was added, and the bath boiled until the carbon was high enough, when the manganese and silicon was added, and the final test taken. The results from this series of operations were very irregular. On one heat we would get a carbon of over 3.25 per cent while the next would give us only about 2.75 per cent. It was, however, easier to regulate the analyses and the iron seemed to pour cleaner, due to the lower sulphur contents. The iron was rather sluggish, due to low phosphorus contents, and had to be handled rapidly.

From our acid bottom experiences it was found that gray iron could be made by any of the above methods, cheaply and well, with several defects. Hard iron was often encountered, hard spots were quite frequent, and the iron was always dirty and contained inclusions of a non-metallic character. The quality of the castings was very irregular as to composition and from a strict standpoint it was not to be considered as iron of the highest quality. Many of our customers required a high-speed machining iron and as we could not absolutely guarantee this product we turned to heat treatment to soften the castings.

Heat Treatment of These Iron Castings

Our first attempt was toward the softening and elimination of hard spots. Several sets of small sized castings were thrown into the electric furnace after the day's run, and allowed to soak over night. In the morning they were taken from the furnace, allowed to slowly air cool and then machined. The results were at first surprising, the hard iron castings machining readily and appearing free from any hard spots. Later this was found to be very unsatisfactory from many points —hard spots appeared from irregular cooling, castings cracked from being heated too rapidly and warping was frequent.

A small oil-fired treating furnace was built and placed in operation. At once a great difference was apparent. There were no hard spots, the cracking disappeared and, after different experiments on placing castings in the furnace, warpage was eliminated. Our results were so good that further experiments were conducted with the idea of turning out gray iron castings of different hardness but of the same heat or analysis. This was found to be practical if carried out under careful control. Castings were thus made from the softest iron to a very hard gray iron which could only be machined with difficulty, this class of work finding a large market in the cement and brick industry where a long wearing iron was desired which could also be machined. From the above experiments certain desired changes in operation were shown and exact methods of procedure were developed covering the manufacture of gray iron from steel scrap, borings, and other iron of this kind.

Gray Iron from Steel Scrap

In the manufacture of irons from steel scrap, the point of greatest difficulty is that of obtaining carbon contents of over 3 per cent in the finished product. The saturation point of the iron-carbon series is located close to 4 per cent carbon, and if the iron and the source of carbon were to be held in an intimate contact for a sufficient length of time, equilibrium at the above point would be established if no opposing conditions were to arise. In commercial practice these opposing conditions are the main points of failure.

It has always been found that any material used for the purpose of adding carbon to the bath will result in percentages of carbon obtained directly in proportion to the ash content of the material used. It seems that materials containing a high percentage ash offer the body to a slag condition which materially interferes with the metallic absorption of the carbon by direct physical means—that of a thin film of slag through which the carbonaceous material cannot penetrate. With this in mind any re-carbonizer used should be carefully examined as to its ash content. Under this caption such materials as graphite, petroleum coke (not gas coke such as is made by the gas companies and placed on the market in briquettes), pitch or retort coke, low ash coke, low ash anthracite coal, etc., offer an excellent material. Charcoal, while low in ash, is not recommended due to its low specific gravity which allows it to float very high on the bath and offers too much waste from oxidization. Retort coke known as "Queen Bee" is the most suitable material to use, both from the side of technical utility and cost.

Slag on the bath is one of the greatest points detrimental to successful carbonization and, until the carbon is high enough, it should at all times be kept from the surface of the metal. If the bath is kept free of slag it materially aids the introduction of carbon into the metal. Iron will easily take up carbon to about 2.75 per cent without agitation. After this point is reached it will be necessary to boil the bath so that all of the metal passes directly under the arc where the speed of carburization is very rapid. The presence of slag will interfere by the carbon reducing the silica and burning off as carbon monoxide. The silicon reaches the surface of the metal, combined with oxygen to silica, and the above is repeated at the expense of the carbon. This boiling is best done either with green wood poles or with hoe-shaped rabble bars.

The Practice Recommended

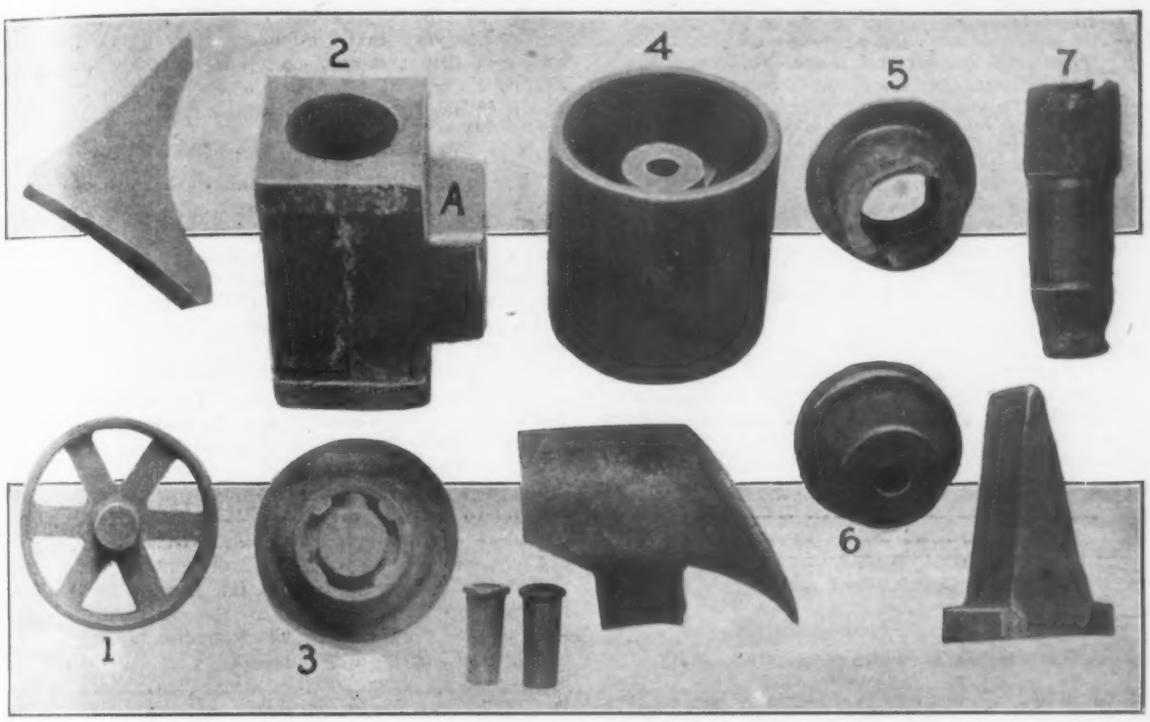
Charge on the hearth of the furnace the carbonizing material calculated to 3.50 per cent carbon, the efficiency, determined by the material used, ranging from 50 per cent for common coke to 75 per cent for graphite, based upon the actual carbon contents. The material should be of small size preferably under ⅛ mesh. Under no conditions charge any slag material. Now charge the metal and turn on the current, sealing all doors as far as possible, as any air entering the furnace will only result in a needless burning up of carbon. As soon as there are small pools of metal under each electrode, throw in these holes a small shovel of the carbonizer. This will tend to steady the arc, and at the same time will furnish a spot of carbon directly where needed. This will increase the speed of melting as, during the heating up of the metal to its melting point, it will absorb carbon slightly and aid by a lowering of its fusing point. Be sure that the doors are kept well sealed at all times.

As soon as the bath is melted open the doors and inspect the furnace. Any material on the walls can be pushed in and the surface of the metal can be inspected for any slag coming from the bottom or from any dirt or other foreign impurities in the metal charged. If any slag shows it should be carefully raked off and sufficient of the carbonizer added to cover the surface of the metal. Take a spoon test and pour into a sand mold on end. A good size test bar is about 1 in. square by 6 in. long. Leave it in the sand until black and then

air cool or water quench. This test will usually show blowy and will be clear white. The fracture will appear rather fine with irregular crystals. If a chemist is at hand a sample should be sent to him for analysis—usually carbon at from 2.50 to 2.75 per cent. If there is plenty of carbon on the bath it will not be necessary to make any further additions; if not, enough must be added to cover the metal. It is very important at all times to keep a good blanket of the carbonizer on the bath until your carbon is sufficiently high.

If the metal is hot enough to run cleanly from the test spoon, one can go ahead; if not, it must be further heated. When this temperature is obtained the bath radiating from the center. To all who are familiar with cupola white iron it is readily recognized. The carbon is now at a point of from 3.25 to 3.75 per cent, but it is good procedure to take another chemical test for final calculations.

One can now add slag materials to form a blanket for the metal and, as soon as thoroughly melted, add manganese and silicon. When these are diffused a final test can be taken for appearance of fracture. By now the chemist's analysis will be back and, if the carbon is high enough, it is safe to go ahead. At this point never pour on a carbon lower than 3.35 per cent if intended for soft castings. If too low another boiling will



SOME OF THE CASTINGS WHICH WERE HEAT TREATED

No. 1 is a small wheel for light street trucking. The rim section is approximately ½ in. thick and is required to be hard in order to stand the required wear. The hub must be bored for a shaft and during the treatment must be kept soft. These castings cannot very well be cast in a chill as cracks will develop at the section where rim meets the spokes. After being heated to a bright red and allowed to soak the wheels were quickly pulled and inserted into a water-cooled pipe which tightly fitted the rim. The hub was surrounded with red charcoal and covered with lime. The rim was thus made dead cold while the hub was still nearly red. A casting on being broken showed a very soft, open iron in the hub, and a very hard gray on the rim. There was no trouble with cracking or warping.

No. 2 is a bearing block used by cement industries on their conveyor systems. The face A is required to be soft enough to drill and tap while the rest of the casting should be of a harder grade gray iron to eliminate wear. The hardness should be at a maximum on the face opposite to A, tapering back to a very soft iron. This was pulled from the furnace at a medium red, the face A buried in lime up to the center of the casting, and an air blast thrown on the opposite face. Results were excellent, and were such that they could not be obtained in any other way.

No. 3 piece is a small face piece used in street car work and is machined all over. Due to the shape of the cores and the extreme thinness of the casting it was found very difficult to obtain a soft casting, free from any hard spots. This piece was heated to a good red and allowed to cool down in the furnace, totally eliminating any of the previous troubles.

No. 4 is another piece of iron used in conveyor belt systems, the roll on which the belt travels. This is bored in the hub and then faced all over the roller. The piece wears out on the upper surface of the outside face. For this it was required that the upper half of the roll be harder than the lower half. After machining from the previously annealed iron the casting was re-heated to a good red, drawn from the furnace and set in wet sand up to the center line. The casting was allowed to cool in this position and from the standpoint of the surface gave good results. Cracking developed at the point where hub joined rim and the treatment was slightly modified to overcome this. The piece was drawn and set in the sand only one-third of the way up. After a few seconds in the sand it was re-moistened giving a quick cooling with excellent results in service.

No. 5 is a bearing casting which required a hard face on the circular hub, with a soft backing on the flat part to resist strain. Drawn and placed around a water cooled chill, covered with lime and allowed to cool.

No. 6 is a chuck plate for a lathe which gave trouble with hard spots. It was allowed to cool down in the furnace; results excellent.

No. 7 is a section of a head from a hard casting which could not be machined by ordinary methods; showing the way it machined and the manner in which threads cut after being given a softening treatment. After being heated it was allowed to soak for two hours and then very slowly cooled in the furnace by lowering the flame from time to time.

---

can be boiled. Green wood poles are shoved in each door and moved from side to side under the surface of the bath. The metal will be violently agitated and the carbon will rapidly rise in the iron. Five minutes boiling will usually raise the carbon content about 0.25 per cent, depending on the temperature and class of material used. Take another test and repeat. When two tests show the same results, equilibrium is obtained. This test will show a "fiery" fracture of large sized crystals usually suffice. In an emergency the electrodes can be lowered into the metal with the power off, but as this is so costly it is not to be recommended unless trouble arises and demands quick action.

Notes: Take your time to obtain good metal, for an extra hour in the furnace is far better than a heat of defective castings. Watch your coke covering on the bath and do not let any bare spots appear as that denotes oxygen is present and the carbon is burning off

above the metal. Above all keep the bath free of slag while raising the carbon. Keep careful check on sulphur analyses as this element will invariably retard the carbonization if present in amounts over 0.10 per cent.

Heat Log of This Method

Charge:

Wrought iron	6,675 lb.
Borings	3,475 lb.
	10,150 lb.

8:40—Current on; 665 lb. ground coke (poor quality) was charged on the bottom under the scrap.

10:40—Nearly all melted; test taken, fracture estimated at 2.50 per cent carbon; chemist analysis later, 2.61 per cent; 100 lb. crushed coke added to bath; no slag apparent.

11:40—Test No. 2 taken; bath vigorously boiled for 7 min. from both doors (6-ton Heroult furnace); test too hard to drill by furnace drill press and tools; 130 lb. ferromanganese added.

11:45—Bath again rabbled and test taken; fractures showing better.

12:00—Test again taken, showing good; 100 lb. ferrosilicon added.

12:05—Test again taken, showing sufficient carbon; 100 lb. silicon added.

12:10—Another test taken shows gray and solid; carbon 3.13 per cent.

12:12—100 lb. crushed graphite flake added and the bath rabbled with hoes for 6 min. from both doors; 100 lb. ferrosilicon added.

12:17—Light slag added with 50 lb. coke and rabbled for 3 min.; previous test comes back 3.26 per cent carbon; final additions added and doors sealed.

12:25—Final test taken shows a soft gray with center heavy in graphite; poured into medium size machinery castings.

Analysis from casting:

	Per Cent
Carbon	3.40
Phosphorus	0.142
Sulphur	0.042
Manganese	1.16
Silicon	2.90

Kwhr.: 595 per ton of metal charged.

Procedure When Melting Iron Borings

Charge sufficient borings to cover the hearth to a depth of about 2 in. Then add the carbonizing material calculated to 0.50 to 1 per cent, depending on the cleanness of the scrap used. Care should always be used to eliminate any lumps of oxidized borings as they will only give trouble later on. The balance of the charge can now be added and the current turned on. As melting proceeds charge a small amount of coke under each electrode and keep the doors sealed as far as possible. When melted, run a bar over the bottom and pry up all "nigger heads." Iron borings will sometimes melt down and leave a heavy skull on the bottom, which will later come up and carry slag with it. This must all come up before proceeding any further. Carefully rake off this slag, add re-carbonizer and boil. Take tests as in the use of steel scrap. These will show usually a hard gray and it will be necessary to raise both the carbon and the silicon by the afore-mentioned means. The final test should show an open grain with plenty of free graphite toward the center of the test piece. When this character of test is obtained pour.

The practice used on iron scrap is exactly the same as for iron borings.

The above methods are illustrative of those followed to obtain a soft, free cutting gray iron. There are, however, heats melted where it is impossible to obtain a soft iron, and as these cannot be scrapped a method must be devised to use them. This is attained by the use of annealing and heat treating. A small sized furnace, similar to any steel foundry annealing furnace, can be used with the best of results. Pyrometer control is of course best, but, if not at hand, good results can be obtained by the eye after a few attempts. In our experiments we did not have a pyrometer so it is rather difficult to exactly describe our procedure.

Annealing Iron Castings

The castings are charged into a cold or slightly warm furnace, care being taken to support any pieces which would be liable to warp. The charging must be such that each piece has good access to the heat and I find here that a system of supporting screens works excellently. Charge a small amount of some carbonaceous material on the furnace hearth to keep the atmosphere more or less neutral, then turn on the flame. For this purpose gas gives the best results, as a flame can be obtained which is practically reducing, although oil can be used. Heat up slowly to a bright red, allow to soak sufficiently for all sections to attain this temperature, shut off the flame and allow furnace to cool down, keeping all openings tightly sealed. When blood warm, the castings can be removed from the furnace and will be found to have softened enough to be machined at high speeds.

Notes: Be very careful as to the flame temperature as iron is very easily burned, especially on the sharp edges of thin sections. Keep the furnace well sealed from air currents as a blast of air on the castings will result in hard spots. Heat and cool slowly.

Variations in the Treatment of Iron

Up to the soaking point all of the operations are the same. It is from this point on where the practice differs depending on what is desired. As slow cooling softens the iron, so rapid cooling hardens it. The principle to follow is that the harder the iron desired the more rapid the cooling. Another point in this process is the fact that one face can be hardened while the other parts of the casting remain soft. This is similar to chilling when cast, except that the chilled portion will be a hard gray instead of a white iron. This finds large use where only one casting is to be made, and where the cost of a chill for this piece would make the cost excessive. The exact methods of procedure will depend upon the character of the iron desired and the class of casting to be treated.

There are many ways to obtain this rapid cooling—air, oil and water, wet sand, iron plates, water cooled pipes, etc., so arranged that the portion to be chilled is kept apart from the body of the casting. The hardness is best regulated by the temperature of the piece at the start of chilling. If chilled at a good red heat until cold, the iron will be harder than if the chilling is started at a lower red. Iron is very easily affected by this treatment and, after becoming used to the methods, one will find that surprising results can be obtained. One illustration shows some of the castings treated.

The foregoing examples are given, not as a text, but as concrete examples of results obtained. While, due to lack of equipment, our results and methods of operation were rather crude the fact remains that many castings were saved which ordinarily would have been scrapped. Not only that, customers were given castings which they desired and which gave real service, but new lines were developed and work was taken which formerly had been refused. The new lines and markets developed were such as to make the undertaking highly profitable.

Operations on a Basic Bottom

Up to this point we had successfully eliminated all of our troubles due to hard and spotty castings but were unable, by even the strictest practice, to eliminate dirty iron. Castings would be poured using skim gates, "buzzers," and almost every means known to give clean iron, but with no success. Ladles were carefully examined and the bath was carefully skimmed before the pour. Iron was poured which showed absolutely clear in the ladle and, during the pour, there was no dirt rising in the heads or skim gate and yet, upon machining the castings would show up with dirt or slag pockets, sometimes pieces as big as a walnut appearing in the surface of the work. Another trouble arising were interior shrink holes and small gas pockets. Larger heads were tried, heavy feeding was resorted to, but these troubles still remained.

It was thought at first that some of these troubles might be caused from the melting stock so duplexing from the cupola was tried. The dirt still appeared at intervals so it was finally decided to change our operation to basic. The furnace was changed over and the results were at once apparent. Castings were obtained

which were of a real quality iron. There were no dirt or slag spots and it was a very much easier matter to obtain soft iron than by the acid operation. The quality of the iron was better, it appearing much tougher and yet machining easily. This was explained as follows:

1. The iron was being held under a heavy reducing slag for a period of about three hours, eliminating all dirt and non-metallic impurities which rose up and combined with the slag. Sulphur was cut down to a minimum with the consequent decrease of its attendant evils.

2. There was no reducing of the hearth by the carbon, making it much easier to obtain high carbon irons. Silicon percentages were easily controlled. There was a saving of alloys due to the reducing action of the slag. Carbons as high as 3.80 per cent were easily obtained by the use of steel borings.

3. By using steel scrap as the base, gray irons of high softness and great toughness could be obtained by the lowering of the phosphorous contents. The higher heat of the electric furnace gave such temperatures as to easily run these irons. Shrink and blow holes disappeared due to the deoxidizing powers of the basic slag.

Defective castings from all sources dropped from the high figure of 12 per cent to under 5 per cent during the first week and, as operations progressed, they were almost entirely eliminated. The greatest point of the operation was the fact that customers were highly pleased. As many stated "they did not know that gray iron could be made of such high strength and still machine so readily." From these results it was, of course, decided to adopt basic operation. While the actual costs of the metal were several dollars a ton higher, the great saving in defectives and complaints were so lowered that the operation was a great deal cheaper than anything ever before obtained. With a power rate of from 0.80c. to 1c. per kwhr., the conversion costs averaged about $15 per ton, which with borings at $6 gave a remarkably low cost to the molten metal. Iron borings were used as much as possible as they melted quicker and gave a saving of about $3 per ton in alloys. Our practice was carefully checked and a standard method of procedure was adopted.

Fine Iron from Cold Scrap

This practice covers the manufacture of the highest quality of gray iron it is possible to make under present metallurgical conditions and, while the results are essentially those for the Pacific Coast, there is no doubt but what makers in other localities could profit by our experiences.

The scrap, as clean as possible, is charged on the hearth until about half is in the furnace. Then about 100 lb. of small sized carbonizing material is added, together with 1½ per cent of the charge of crushed, dead burned, lime. The balance of the charge is put in and the current turned on. The doors are kept sealed as much as possible and when the entire heat is melted the walls are scraped of any adhering scrap, and the bottom is freed of any lumps. The current is kept on until the metal is fairly hot when the first metal test is taken, and allowed to cool to a black in the sand. Quite often the metal is now ready to pour without any more treatment. If not, boiling with more coke is resorted to and small additions of silicon may be made.

If it is necessary to do much boiling to raise the carbon, the bath will have to be slagged off. The carbon will raise more rapidly on the basic hearth than on the acid. When this element is as high as desired the finishing slag can be added and the heat finally cleaned of any gas. This final slag is composed of 1½ per cent of the charge lime, 25 per cent of the lime spar, and a few shovels coke. This is best when used in the ground condition and thoroughly mixed as it seems to become molten easier. Basic slags on iron are prone to lump and it is often necessary to use large amounts of fluorspar to increase the fluidity. Rabbling with a flat bar will usually mix up a slag fairly well. This slag should be worked over unto a regular carbide one, and the metal held under this until tests show a finished iron. As the heat has already been held under a heavy lime slag up to this time it is very seldom necessary to hold for any length, as the sulphur and gases have usually been eliminated under the first slag. I find it good practice to work the heat at this time to eliminate anything held in the metal. A few minutes of heavy rabbling will usually lift up any included slag and leave a free, clear iron.

Just before pouring carefully rake the bath free of all slag and coke or it will foul the ladle in pouring. A tea spout ladle is recommended on this class of casting work, lined with a rammed magnesite. I find that ground magnesite mixed with sodium silicate as a binder gives excellent results. If the metal is poured very hot and allowed to stand in the ladle for five or ten minutes any small slag spots will rise and can be skimmed.

When I entered on this work, I began with an unbiased mind as to whether acid or basic practice was desirable. I was not swayed by previous experience or by what has been written on the subject, but took results as I found them. They are not given as absolute, but are merely the experiences of one man. I will leave the reader to his own conclusion as to which method is preferable, for what is preferable for one may not be so for another working under totally different conditions.

Tributes to the Late Samuel T. Wellman

Tributes were paid to the memory of the late Samuel T. Wellman at a meeting held by the Associated Technical Societies of Cleveland Jan. 9. This was the first meeting of a series to be held by this society on the iron and steel industry. The meeting was designated as a Wellman memorial night and a number of speakers recounted personal reminiscences of their association with Mr. Wellman and referred to his important contributions to the iron and steel industry in the development of the open-hearth process.

James H. Stratton, engineer of construction Wellman-Seaver-Morgan Co., of which Mr. Wellman was one of the founders, read a portion of an address made by Mr. Wellman at the time of his election as president of the American Society of Mechanical Engineers in 1901 on the growth of the open-hearth industry and showed lantern slides of various early types of open-hearth furnaces.

Ambrose Swasey, vice-chairman of the board of the Warner & Swasey Co., paid tribute to Mr. Wellman as a man, metallurgist and manufacturer. He said he and Mr. Wellman were close friends for a third of a century and had traveled much together abroad. He found Mr. Wellman an ideal traveling companion. He declared Mr. Wellman's character could be summed up in three words "Noble Christian gentleman." He was greatly impressed by what Mr. Wellman had done for the steel industry of the whole world when he saw Wellman open-hearth charging machines in use on opposite sides of the globe, in France and in China.

W. G. Hildebran, assistant secretary Wellman-Seaver-Morgan Co., read a sketch of Mr. Wellman's life that Mr. Wellman dictated to him a number of years ago. Five-minute addresses were made by John McGregor, C. C. Smith, F. Moeller and A. D. Hatfield, who had been closely associated with Mr. Wellman.

Preceding the speech making program, a banquet was held in the ball room of Hotel Winton, where the meeting took place, and both banquet and meeting were largely attended.

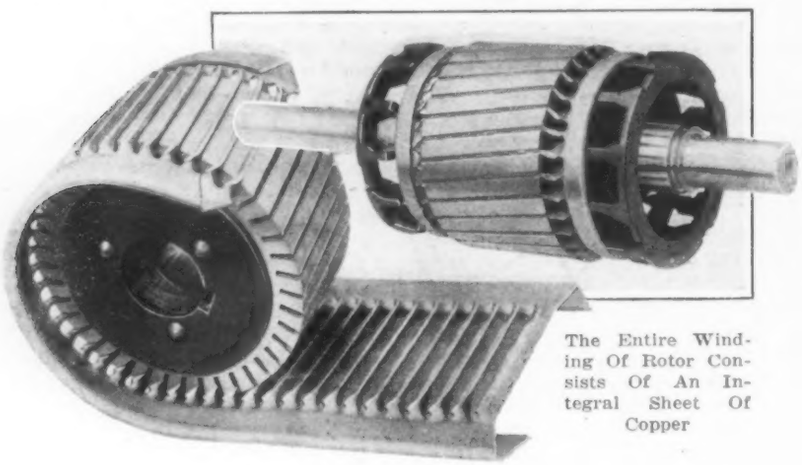
Sixty officials of the sales department of the Bethlehem Steel Corporation made an inspection of the Lackawanna plant, Buffalo, Jan. 12, following the general sales meeting at Bethlehem, Pa. Luncheon was served at the plant at which addresses were delivered by E. S. Knisely, general sales agent, Bethlehem Steel Corporation; Timothy J. Burns, general manager, Lackawanna plant; G. H. Blakely, manager of plate and structural sales department, and E. S. Illig, in charge of sales for the Buffalo district.

Rotor Design the Feature of New Motor

The Louis Allis Co., Milwaukee, has placed on the market a new type HD motor, the outstanding feature of which is the construction of the rotor.

The entire winding of the rotor consists of an integral sheet of copper, punched and formed by a special mechanical process. This one-piece winding is machine wrapped around the rotor core as shown in the illustration, the copper bars being expanded into the core slots by swaging.

The single joint, which extends through the two end rings, is silver welded, after which the metal at both



The Entire Winding Of Rotor Consists Of An Integral Sheet Of Copper

connections is processed by means of a contracting operation. This is said to re-harden the copper at the point where the heat, applied during the welding, softened it, the treatment being intended to produce a lapped, silver welded joint of maximum strength. It is claimed that the rotor winding, except for the joint in the two end rings, is as substantial and indestructible as a piece of pure copper pipe.

The comparatively thin copper stock, of high thermal conductivity, used in the fabrication of the rotor winding, serves also to readily conduct the heat generated in it toward the ends of the rotor bars, where the heat is dissipated through the action of malleable iron fans. The rotor bars themselves constitute a blower, which aids in the ventilation.

The rotor core is a self-contained unit and may be pressed on and off the shaft readily, as it has a straight keyway. Otherwise it is largely conventional except that it employs open slots without the usual overhanging tips.

The electrical characteristics are said to have received equally careful attention also. Unusual starting and running torque are claimed, and the motors are guaranteed to carry their full rated load continuously with a temperature rise not exceeding 40 deg. C. After the ultimate temperature has been reached, they will carry 25 per cent overload for two hours with a temperature rise not exceeding 55 deg. C. The motors are available in standard industrial sizes, voltages and frequencies.

Domestic sales of oak leather belting for December are reported by the Leather Belting Exchange at 451,957 lb. valued at $784,597, or an average of $1.74 per lb. This compares with November sales aggregating 467,816 lb. valued at $826,164, or an average of $1.77 per lb., and with sales in December, 1921, aggregating 285,852 lb., valued at $433,060, or $1.67 per lb. The returns are from companies representing about 60 per cent of the total product.

Continued improvement of the employment situation the country over is reflected in the report of the Department of Labor for December. New England reported overtime employment in the textile industries, while the district including New York, New Jersey and Pennsylvania, reported comparatively better conditions than in former years at this season. The condition was virtually the same in all States.

Center Foundry & Machine Co. Goes to New Location March 1

On or soon after March 1, Center Foundry & Machine Co. will move from its present location at Twentieth and Main Streets, Wheeling, W. Va., to a new plant in Warwood, a few miles north of Wheeling. The new plant now nearing completion provides greater area, permitting a much greater production, than the old one, and it will be possible to make larger castings, since the crane lift in the new foundry is 25 ft., as against only 12 ft. in the old one.

The new foundry is 200 ft. long and 50 ft. wide, made up of two bays, 25 ft. wide, of mill construction, steel sash and monitor type roof. There are two cupolas, one of 20 tons and the other of 10 tons capacity, and the foundry is served by a 20-ton and a 10-ton crane. Flask storage yard, 30 x 100 ft., is located at one end of the foundry building, while at the other are the chipping shed and machine shop, covering an area 30 x 120 ft. The company's land holdings extend 600 ft. beyond the machine shop, making possible further expansion. Pattern storage building, which is erected, contains 8000 sq. ft. and is adjacent to the pattern shop, which is housed in a separate building.

The plant is well laid out and embodies most of the modern ideas in foundry construction. The company plans no departure from its present lines, chiefly steel mill castings, with a jobbing business as a side line, but capacity will be double that of the old plant and individual castings of greater size can be made because of the higher clearance of the new unit.

Moving Pictures Show Making of Cast Iron Pipe by DeLavaud Process

At the annual meeting of the Philadelphia Foundrymen's Association, Inc., held Jan. 10, at the Manufacturers' Club, the members and guests were enlightened as to the making of cast iron water and gas pipes by the DeLavaud centrifugal pouring system by means of moving pictures which were shown through the courtesy of the United States Cast Iron Pipe & Foundry Co. John T. Capron, of the company, explained the pictures and answered questions. The pictures were made more interesting through the fact that they compared old and new methods. Mr. Capron and his company were given a vote of thanks for the instructive evening.

The officers of the association, including Frederick M. Devlin, president, and Howard Evans, secretary, were re-elected for the coming year. Mr. Devlin succeeded his father, the late Thomas Devlin, having been appointed to the office following his father's death.

Inasmuch as the New England Foundrymen's Association was holding its annual meeting in Boston on the same evening, a telegram of greeting was sent to that organization.

The meeting was preceded by a dinner and was one of the largest held in some months.

The Studebaker Corporation has announced that it will build and ship 35,000 cars during the first quarter of 1923. This is within 2200 cars of the record second quarter of 1922 and 13,000 more than were produced during the quarter just passed.

The report of the Detroit Employers' Association for the week ending Jan. 16 shows an increase of 5461 over figures given a week ago, or a total of 194,697 employed as of that date. The number employed a year ago was 109,703, while in 1921 it was 35,466.

Cuba's Duty-Free Manganese Ore Supply

Deposits Estimated at 700,000 Tons, Important to United States in Case of War, But Costs Are High and Operations Limited

BY PAUL M. TYLER

Of importance to the American steel industry, in view of the new conditions surrounding the manganese situation as a result of the new tariff, is the privilege of importing manganese ore from Cuba into the United States free of duty under the provisions of a reciprocal treaty entered into by the respective governments in 1902. Under this treaty it was provided that all articles which were on the free list under the Dingley tariff of 1897, which was then in force, should be free of duty when imported from Cuba so long as the treaty remained in effect. This treaty, which also provides for preferential treatment of other Cuban products to the extent of the remission of 20 per cent of the duties collected at the ports of entry, was not abrogated in succeeding tariff acts, including the Fordney-McCumber act which went into effect on Sept. 22, 1922.

In this present tariff act, a protective duty of 1c. per lb. is levied upon the metallic manganese contents of imported ore, corresponding to 22.4c. per unit of manganese contained. A duty is also placed upon the manganese contents of ferromanganese which compensates for the duty on the ore and also affords some protection to the manufacture of the ferroalloy in this country. These rates were intended doubtless to be applied to imports from all countries. Actually, however, owing to the fact that manganese ore was in the free list of the tariff act in force at the time the treaty with Cuba was consummated, manganese ore can still be imported into the United States without payment of tariff duties, provided satisfactory evidence is presented to show that it was produced by Cuban mines.

Formal recognition of the situation has been made by the Treasury Department and during the last week of December notices were sent to the collectors of customs at the different ports, stating that articles which were on the free list in the tariff act of 1897 (Dingley) continue to be entitled to free entry into the United States when the product of the soil or industry of Cuba, whether or not they may be in the dutiable list of the tariff act of 1922.

Cuban Mining Costs High

Under normal conditions, the manganese ore deposits of Cuba have not proved capable of furnishing a very large output of high grade ore at a cost which would permit marketing in competition with the more cheaply mined ores of India, Russia and Brazil. There have been periods of stimulation from time to time, and during the war Cuba finally attained a record production of more than 83,000 tons in 1918. Several hundred claims were opened up and actual production was obtained from many of them. Few Cuban properties, however, were able to operate at a profit under war time conditions even when prices were mounting to $1 or more a unit and American smelters were less particular as to the quality of their ore supply.

Weld and Crane* state that in 1918 mining and treatment costs ranged from $5 to $8 per ton of product at different points and that transportation to railroad cost from $2 to $10 per ton. Their estimate as to average total costs toward the end of the war period was $14 per ton, f.o.b. Cuban port, but this relatively low average was attributed to the fact that the two largest producing properties were situated practically on the railroad. It may be further noted that this figure did not cover amortization of investment and probably made no allowance for depletion, although it did include certain other general charges. In discussing future possibilities, these authorities came to the conclusion that the cost of producing Cuban ore would eventually drop to $11 or $12 per ton, which is equivalent to at least $13 or $14 per ton at United States Atlantic seaboard points. While some ore may now be produced at a little under these figures, subsequent developments have tended to confirm the estimates made at that time. There is not much prospect of Cuban manganese being marketed profitably at less than about 35c. a unit.

Aside from the matter of cost, Cuban ores have the reputation of being variable in quality and are characteristically high in silica. There are one or two important exceptions to this statement, as evidenced by the continued shipments of high grade chemical ore from Cuba since the armistice, but the furnace ore has been generally low grade.

Deposits Mostly in Oriente

Most of the manganese mines of Cuba are situated along the south coast, being found in the provinces of Oriente, Santa Clara, Matanzas and Pinar del Rio. The only extensive deposits, however, are in Oriente, where manganese is found in three districts, one north of Santiago, another south of Bayamo and Baire, and the third on the Caribbean coast between Torquina Peak and Portillo. The Santiago district is the only important producing area, although there are moderately large properties in the Bayamo-Baire district. In the province of Santa Clara, a little ore has been found near the Caribbean coast west of Trinidad and small deposits occur in Pinar del Rio, north of the city of the same name and also farther west, near Mendoza.

The principal groups of mines, in order of their importance, are the Ponupo, the Cristo and Cauto. Both the Ponupo and the Cristo properties are owned by Aguilera & Co. The Ponupo group is located practically on the railroad and has been operated on a fairly large scale since 1898, the first shipment having been made in 1895. The grade of the ore in later years has tended to become poorer, but these properties are credited with ample reserves of good quality ore (as manganese ores run in Cuba). The Ponupo mine was reported idle in 1920, whereas in 1918 it was producing in the neighborhood of 3000 tons of furnace ore a month. The Cristo claims owned by the same company are much smaller, but the product in 1918 (when both were operating) was running higher in manganese, although most of the ore had to be washed.

Recent analyses of the Ponupo ore show an average content of 38 to 40 per cent manganese, although published data as to earlier operations indicate as high as 53 per cent. Some of the Cristo ore carried 46 per cent manganese as shipped. According to D. F. Hewett of the U. S. Geological Survey, the Cauto group in 1914 was mining ore containing from 43 to 47 per cent manganese, 9 per cent silica, 2 per cent iron, and 0.05 per cent phosphorus and was also shipping some chemical ore containing 85 to 87 per cent manganese dioxide and, presumably, sufficiently low in iron. The Cauto mines are owned by the Cauto Mining Co. and are located at San Nicholas in the Santiago district. The production during the peak period of 1918 was at the rate of about 2000 tons a month. The only company that has maintained production is an American concern operating at Buecito on the fringe of the Bayamo-Baire district. As reported by Weld,** the output from this

*Manganese, Uses, Preparation, Mining Costs, Etc.—U. S. Bureau of Mines Bull. 173 (1920).

**Engineering and Mining Journal, Jan. 22, 1921.

property in 1920 was 3000 tons of chemical ore and 1000 tons of metallurgical ore, which constituted the only new production from the whole country in that year, although some 2000 tons was shipped from stockpiles in Santiago and in Boqueron.

A Government Investigation

On account of their close proximity to this country, the manganese resources of Cuba are of extreme importance to the United States in time of war. Ernest F. Burchard of the U. S. Geological Survey, and Albert Burch of the Bureau of Mines visited, in 1918, practically all the Cuban manganese deposits that were known at that time. Much of the information thus obtained with respect to individual properties and the occurrence of the ore was incorporated in an article published by the former in 1919.† This constitutes the best published record, at least, of Cuban manganese properties and should be consulted by any one who is seriously interested in the subject.

According to this authority, the manganese deposits are found principally in metamorphosed sedimentary rocks (limestones, sandstone and shale), although at one locality the ore occurs in rocks of volcanic origin. The ore bodies are characteristically surface deposits, but in some places the manganese extends to a depth of 100 ft. or more. While the deposits vary materially in form and in their mineral associations, they may be loosely classified into three general types: (1) Deposits in bedded rocks, (2) deposits in irregular masses of silicious rock (locally termed "bayate" or jasper), and (3) deposits of nodules and fragments in clay. Most of the largest and richest deposits are associated with jasper. The limestone replacement deposits are also rich, but they are scarce and generally small. The third type usually yields good ore when the clay is removed by screening and washing, but the deposits of this type are neither numerous nor extensive and doubtless the cost of washing would often be prohibitive. There are several types of bedded deposits, but a common occurrence seems to be a mixture of poorly consolidated tuffaceous material, pink clay (in granules), zeolite minerals and manganese dioxide.

Silica Removal Difficult

With respect to the character of the ore itself, Burchard reports that it consists of some or all the oxides—pyrolusite, psilomelane, manganite, and wad. A little braunite was identified in samples from one locality, but this is the only evidence of silica combined with the manganese mineral, as no manganese silicates have been found. As there are also no carbonate ores, the possibility of beneficiating these ores and especially of eliminating the excess of silica by mechanical means naturally suggests itself. The descriptions, however, of the different ores and examination of various samples show that the ore minerals are so intimately mixed with the silica-bearing matter as to prevent the economical removal of this objectionable constituent which has done so much to restrict the consumption of Cuban ore in American furnaces. There is usually no trouble as to phosphorus which ordinarily runs less than one-tenth of 1 per cent.

Iron contents are quite variable and the analytical data available do not indicate any definite ratio of iron to manganese either for the country as a whole or even for different parts of the same property. Returning to Burchard's report, for example, we find that at one of the larger properties the milling ore ranged from 26 to 31 per cent manganese and from 6 to 10 per cent iron, whereas the shipping ore from the same pit ran from 38 to 40 per cent manganese and only 5 to 7 per cent iron. The insoluble in these two cases ranged from 27 to 32 per cent for the milling ore and between 14 and 16 per cent for shipping ore. The best ore from this property contained 47½ per cent manganese, less than 3 per cent of iron, and about 7 per cent insoluble. While it is evident that individual analyses will vary greatly, it is possible to say that a typical Cuban furnace ore will run approximately 40 per cent manganese, 12 per cent (or more) insoluble, under one-tenth per cent phosphorus, and about 4 per cent iron.

Ore Reserves Are Small

Compared with the huge accumulations of manganese ore that have been opened up in India, in the Caucasus, and even in Brazil, Cuban resources are meager. It is always absurd to make positive estimates as to the total amount of ore that may ultimately be won from any large area, even when it has been prospected so thoroughly as have many of the more promising regions in our neighboring island. There is the ever-present possibility of uncovering hitherto unsuspected deposits and frequently the tonnages recovered from a property have been many times what careful and painstaking estimates indicated, even after a pit had been operated for several years. On the other hand, it may be similarly urged that preliminary estimates are just as likely to prove too optimistic.

The Cuban resources were surveyed with considerable thoroughness by Burchard and Burch in 1918. Their estimate is confined to "probable" ore containing 36 per cent or more of manganese and including the tonnage of concentrate from ores which can be readily and profitably beneficiated so as to yield a product of at least this grade. While the term "probable ore" is not so certain as "ore in sight," and it does not necessarily imply that the mineral can always be economically extracted, it is a much more conservative figure than "possible ore," which ordinarily involves a larger element of guesswork, since it includes ore which cannot be viewed as well as the downward extension of deposits that are only partly exposed. The estimate prepared on this basis indicated a reserve, more or less assured, amounting to from 700,000 to 800,000 tons of ore containing 36 per cent of manganese or its equivalent in terms of concentrate produced from lower grade ore. Of this total between 600,000 and 700,000 tons is credited to the Santiago district and 50,000 to 70,000 tons to the Bayamo-Baire district. The remainder, or approximately the same amount as that in the Bayamo-Baire district, may be obtained from various scattered localities, including Los Negros, Camaroncito, Trinidad and Mendoza.

Shipments to United States

The production of manganese in Cuba has been an intermittent industry, although for about 20 years, and until 1909, exports were made almost every year to the United States. The Cuban statistics show only one shipment of manganese ore to any country other than the United States. This shipment was in 1915, when 1985 tons, valued at $22,835, was exported from Cuba to Italy. After 1909 most of the mines were abandoned and remained idle until shipping conditions resulting from the world war restricted American supplies and increased prices to the point where the owners of Cuban mines were again encouraged to reopen their properties. The history of the industry prior to the outbreak of the war is reflected in the fluctuations in exports which are reported in official statistics of the Cuban Government as follows:

Year	Tons	Year	Tons
1888	1,942	1901	30,142
1889	704	1902	26,261
1890	21,810	1903	20,438
1891	21,987	1904	14,500
1892	18,751	1905	4,500
1893	10,640	1906	19,000
1894	nil	1907	35,645
1895	1,394	1908	nil
1896–7	nil	1909	2,500
1898	1,800		
1899	12,558	Total	265,741
1900	21,169		

The next shipment of ore, amounting to 1300 tons, was recorded in 1914 and in 1915 the mines were again producing on a small scale. From then on until the banner year of 1918 the output of Cuban manganese increased by leaps and bounds. Cuban statistics show that 83,305 tons was exported in 1918 and production was even greater, as a certain amount was accumulated in stock piles at the mines. Probably the best record of the effects of war stimulation on the industry is the following table of imports into the United States from

†"Manganese Ore Deposits in Cuba," Ernest F. Burchard. Trans. A. I. M. E., Vol. 63, pp. 51-104.

Cuba as taken from the statistics published by the Department of Commerce:

	Gross Tons	Total Value	Value per Ton
1915.....	5,141	$69,453	$13.50
1916.....	30,563	514,184	16.85
1917.....	44,511	612,413	13.75
1918	82,974	2,751,193	33.20
1919.....	35,320	1,433,202	40.60
1920.....	8,247	266,744	32.40
1921.....	34	679	20.00

The relation between price and quantity produced in Cuba is clearly brought out in the above table. The slight reduction in the average price per ton as shown in 1917 reflects the fact that lower grade ore was then being shipped than could have been marketed under more normal conditions.

Mining Difficulties

While there are a few large operators in Cuba, many small properties were opened up by individuals having little capital. A large number of the claims are isolated and transportation is difficult, slow and costly, even in the dry season. In the wet season it is practically impossible to ship ore from remote localities even by pack mules. For such localities, haulage can be carried on only during five or six months of the year. While the pits themselves may be operated throughout the year, this would involve storing the product during the wet season and consequently would require more capital than most of the small producers could secure against the chance of profitable shipment during the months when the roads are passable. Owing to the uncertainty of the market for Cuban ore, the banks could not be expected to extend much assistance.

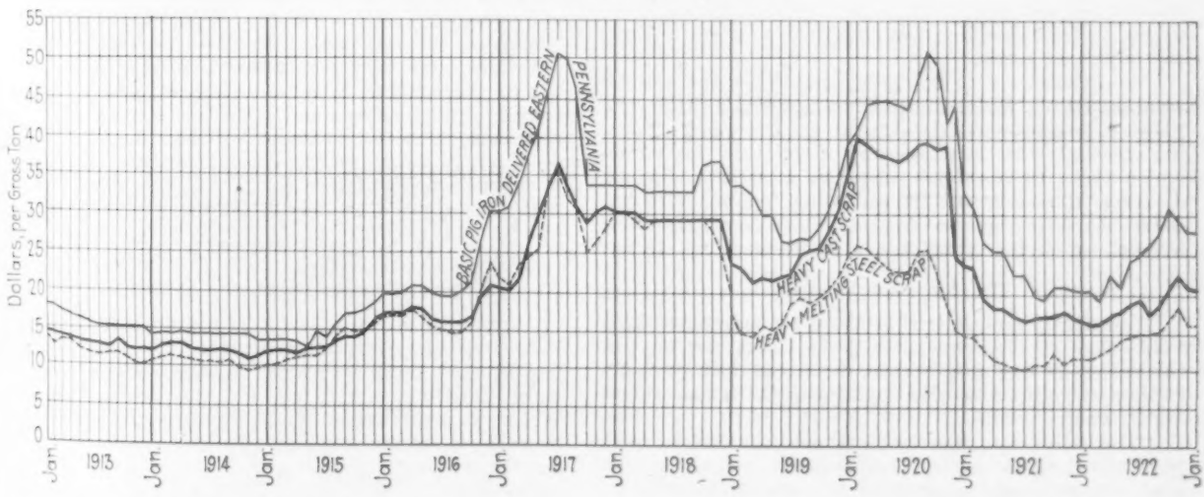
Another difficulty is the chronic scarcity of labor. During the war wages of common labor increased to $1.80 and $2 per day of nine hours and, instead of declining, as was generally expected they would do, they have actually increased since the armistice. The mines must compete with the sugar mills for their labor supply and in the season of 1921-2 field hands were getting from $2.50 to $3 per day and the cheapest mill hands were getting about $2.50. At the more isolated mines it is always difficult to get food and supplies and the miners drift away and cannot be replaced.

During the peak of production in 1918 the railroads were unable to handle all the tonnage promptly, owing to the fact that the cane grinding season coincides with the dry months when ore shipments were at their height.

Not a Full Year's Supply in Sight

Whereas Cuban manganese mines may be considered an important war resource of the United States, it is not likely that they can contribute a larger proportion of American supplies than they did in the latter part of the war period. The normal ferromanganese requirements of the country are somewhere near 350,000 tons annually. On the basis of 110 units of manganese in the form of ore yielding one ton of 80 per cent ferromanganese, almost three tons of Cuban ore are needed to make one ton of ferromanganese. Hence, if Cuba were to satisfy the entire quantity used in this country, she would have to furnish over a million tons annually. When it is considered that the whole production of the island to date has been less than 600,000 tons and that Burchard's estimate of probable reserves is only 700,000 tons, it is obvious that the steel industry of the United States must still import the bulk of its huge consumption of manganese ores from other foreign sources. While the tariff will have a tendency to revive Cuba's manganese mining industry, which has been practically dormant since the war, as well as to encourage activity in domestic mines, it is not likely to alter greatly our dependence upon India and Brazil or reduce the hope of again obtaining steady shipments from the Black Sea.

Ten Years of Prices of Basic Pig Iron, No. 1 Heavy Melting Steel and No. 1 Machinery Cast Delivered Eastern Pennsylvania



NOTWITHSTANDING the claim sometimes put forward that good quality heavy melting steel scrap is potentially worth to the steel maker within at least $1 a ton of the price of basic pig iron, a comparison of the market prices of these two commodities, delivered to steel plants in eastern Pennsylvania, over a period of 10 years fails to disclose any such closeness in price except at rare intervals, and then only briefly.

In the 10-year period from 1913 to 1922, inclusive, the average price of No. 1 heavy melting steel scrap delivered in eastern Pennsylvania was only 67.7 per cent of the average price of basic pig iron during the same decade. This, too, included the war period of fixed prices when the spread between basic iron and steel scrap, as arranged for by the War Industries Board, was narrower than at most other times.

In one year, 1918, during nearly all of which Government prices ruled, steel scrap averaged 84.2 per cent of the price of basic pig iron. No other year approached this except 1916, when the scrap price average was 80.1 per cent of the average price of basic iron.

This comparison of prices yields another interesting conclusion, namely, that the spread between steel scrap and basic pig iron was narrower in the years before the war than in the post-war years. For example, in 1913, 1914 and 1915, the steel scrap price was 74 per cent of the basic pig iron price; in 1919 it was only 59 per cent of the pig iron price; in 1920 only 51.1 per cent; in 1921, 50.5 per cent, and in 1922, 59.3 per cent.

The current market prices for basic iron and No. 1 heavy steel scrap in eastern Pennsylvania (based on prices quoted in THE IRON AGE of Jan. 11) bear out within a fraction of a per cent the average spread between basic iron and steel scrap over a 10-year period. With basic at $28, delivered, and steel scrap at $19, delivered, the latter is approximately 68 per cent of the former in price, the 10-year figure being 67.7 per cent.

BETHLEHEM PLANS

President Grace Says $25,000,000 Will Be Required at Lackawanna Plant

BUFFALO, Jan. 18.—The expenditure of $25,000,000 will be required to put the Lackawanna plant of the Bethlehem Steel Corporation in proper shape to meet the requirements of the steel industry in the territory which this mill will serve, according to a statement made by President Eugene G. Grace in an address to the Buffalo Chamber of Commerce. Mr. Grace, Charles M. Schwab, J. Quincy Bent, vice-president in charge of operations, Timothy J. Burns, general manager of Lackawanna plant, E. S. Illig, in charge of sales, and other Bethlehem officials were the guests of honor at the banquet. It was in the nature of a welcome to the Bethlehem officials who have become identified with Buffalo by reason of the purchase of the Lackawanna property.

Mr. Grace's address was in substance a statement of Lackawanna plans. He made it clear that the entire plant will have to be revamped according to Bethlehem standards, and that the work will be carried to a conclusion as fast as labor and transportation conditions permit. One of the points brought out by the speaker was that the plant would be run from Buffalo and at Buffalo, and that the new owners were satisfied with the personnel of the organization.

Important Factor of Success

The geographical location of Buffalo with reference to lake, rail and barge canal transportation is the fundamental point on which Bethlehem expects the successful future of Lackawanna will rest. Dwelling on the progress since Bethlehem acquired the property, Mr. Grace stated that about 140 new customers were added since the property was acquired. He pleaded for cooperation and stated that the new owners had no interest in any other channel than the manufacture of steel; that they were not in politics and were not interested in interfering with affairs outside the plant. He asked the indulgence of steel buyers until such time as the reconstruction of the plan enables them to fulfill the orders expected.

Mr. Schwab spoke in happy vein of his years in the steel industry. Referring to what he termed the serious phase of his address, Mr. Schwab decried governmental interference with business and pernicious legislation which tends to restrict economical progress. He predicted a time not far distant when big business will assert its rights before Congress, "as other bodies have insisted on their rights" and a better day will follow.

The Railroad Problem

President Frank Alfred of the Pere Marquette Railroad spoke on the transportation problem, saying that the railroads had not broken down but had been the victims of politicians. He objected to Government ownership and control.

"Those of us on the inside know that the railroads have not broken down," he declared. "The attacks upon the railroads are due to the inventive genius of politicians."

"I will ask you a question," continued Mr. Alfred. "What private business in the United States could have turned over to the Government for a period of two and a half years, its plant, its money in the bank, stocks on hand, tools and machinery, its organization and all its employees, the large majority of whom are working under an open shop agreement, and accept in return a rental equal to the profits made during the three preceding years, and at the end of the period take back the property and all of the employees on the basis of an absolutely closed shop plant with a set of rules ond working conditions that gave to the laborer a hand in the management, and furthermore, take back the plant and equipment that has been misused and abused, without adequate reparation?"

Mr. Alfred then analyzed the transportation act to show that there is absolutely no guarantee of a net return of any amount to the railroads and that there is no provision of the law by which railroad earnings can be based upon the amount invested.

The railroad labor board, he continued, has failed to prevent strikes and experience thus far has demonstrated that this provision of the act had been the cause of multiplying disputes between railroad employees and the management and in making them nation-wide.

The whole act, Mr. Alfred said, is too severe a restriction and abridgement of the transportation corporations, although some executives favor a further trial under it. Railroad shops, particularly, he said, should be free from restrictive regulations as to labor.

"The cost of transportation," he added, "cannot be reduced under the restrictive legislation and governmental supervision that railroads now operate under. I am of the opinion that railroads can be more cheaply operated and more nearly satisfy the public, if operated as small independent units than if operated in large systems or in one system. The close personal contact between a railroad and those it serves, can better be had with a small unit."

Toward Government Ownership

The agitation now going on for the pooling of freight cars, Mr. Alfred said, is a 50 per cent movement toward Government ownership.

"This scheme," he said, "is being nursed by certain security holders. Possibly they see the handwriting on the wall and are anxious to dispose of their holdings to the best advantage and look upon Uncle Sam as the best pay and most gullible prospect."

Mr. Alfred defended the administration of railroad officers during the time of Government control and declared that there had been much misrepresentation by politicians in this respect. He quoted both Director General McAdoo and Director General Hines to support his statements.

Concluding with a plea for a more generous attitude toward rail executives, Mr. Alfred said:

"Theories may be advanced by laymen, but facts as they relate to transportation of this great country can only be secured by coming in contact with the practical men who have been awed by the superficial knowledge of laymen in discussing this great problem.

"I shall use my every influence to keep the railroads out of the control of the Government, but if the Government takes them over, I will still remain with the railroads, if the Government will have me, and will do all I can to get them out of Government control. But if experience shows that the people are better satisfied with Government operation, then I shall be satisfied."

Detroit Foundrymen's Association

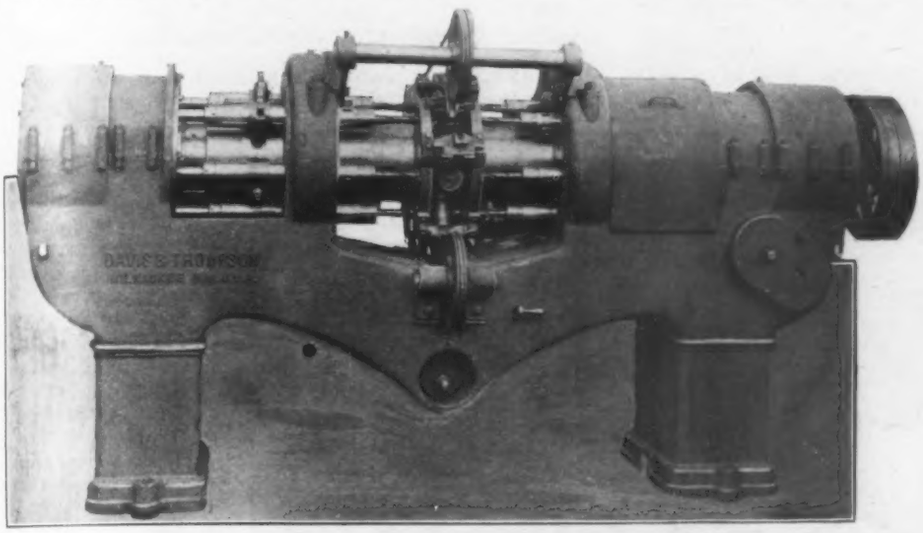
DETROIT, Jan. 20.—About 50 members of the Detroit Foundrymen's Association attended the January meeting held in the Employers' Association rooms in the Book Building, Thursday evening, Jan. 18. A. C. Weber, superintendent Wilson Foundry & Machine Co., Pontiac, Mich., gave a very interesting talk on its production methods, using a series of slides showing each operation and the modern facilities of the plant. Mr. Weber also explained their time-study system, and gave the history of the company from its organization in 1914 when its capacity was 25 tons a day up to the present time with a melting capacity of 90 tons per hour. The presentation was practically the same as given by Mr. Weber at the National Founders' Association in New York, last November, and was enthusiastically received by the attending members.

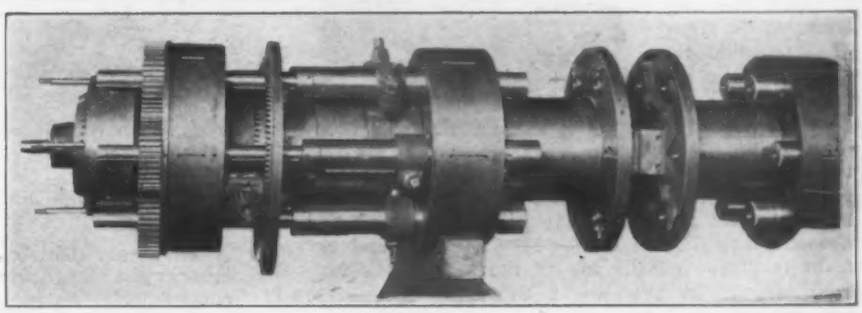
W. R. Klinkicht, assistant engineer of tests, Poliak Steel Co., was the speaker at the January meeting of the Cincinnati Chapter, American Society for Steel Treating, Jan. 11. His address, "The Forging of Large Sections," was illustrated with lantern slides. At the February meeting of the chapter, E. E. Thum, associate editor of *Chemical and Metallurgical Engineering*, will speak on "The Relation Between the Management and the Metallurgist."

PRODUCTION DRILLING MACHINE

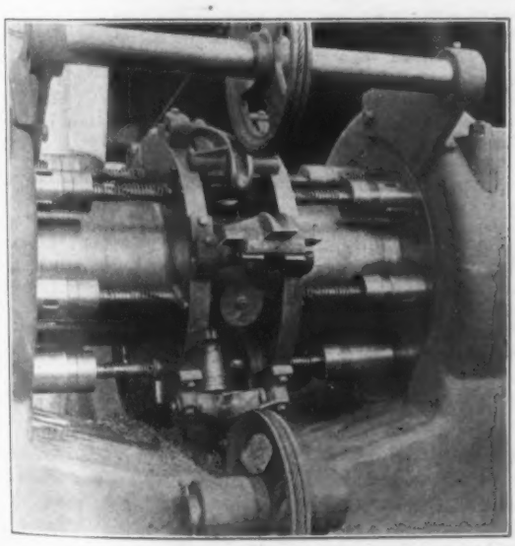
Horizontal, Multiple Spindle Unit for Drilling, Reaming and Threading Small Parts

A horizontal multiple-spindle machine for high production drilling, reaming and threading of small parts has been placed on the market by the Davis & Thompson Co., Milwaukee. The machine as arranged for drilling cross holes in automobile pistons is shown in the illustration, the production being 300 to 400 per hour, depending upon the sizes. Equipped with an attachment for automatic loading, small castings, pipe nipples, bearings and similar parts, are said to be handled at the rate of 1000 to 2000 pieces per hour. The machine is of the continuous type, with no time lost in indexing.





Front View of Continuous Multiple Spindle Drilling, Reaming and Threading Machine, Shown Above. The driving and feeding mechanism for the spindles is shown at the right, and a close-up view of the equalizing mechanism, jigs and other details, below



The operator places the piston on the jig, which is located between flanges as shown. The flanges are equipped wih hardened steel bushings for guiding the drill, springs being provided to hold the bushings in place when drilling. The bushing rotates with the drill, an arrangement intended to minimize wearing off the sharp edge of the drill.

In the operating of the machine the spindle housings, shown in a separate illustration, revolve with the work, away from the operator. The spindles are moved to and from the cam, which is located on the quill between the work spindle and the main quill, and between the housings, as shown. The ring gear, also shown, engages a large pinion which is bolted to the frame of the machine, and is mounted in a bearing that rotates in the same direction as the work. The pinion rolls in the ring gear. On the opposite end of the bearing for the pinion is another pinion that rolls in a ring gear attached to the cam sleeve. As the ratio between the large pinion and the ring gear is the same as that between the small pinion and the cam gear, the cam is held stationary. A ball thrust bearing is provided between the cam sleeve and housing.

On the left-hand end of the housing of the spindle-carrying member there is a jack-in-the-box gear, the driving shaft runs through the center of the machine, a pump supplies oil from the reservoir through the center of the shaft and out through the pinions, to lubricate internal parts of the machine. End adjustment of the spindles is by means of the hardened steel ground clamps shown in the illustration, the spindle being adjusted for length and depth of drill by loosening the nut and placing a crank on the squared portion of the spindle. A hardened steel roller provided under the drill spindles rotates in the cam. Pick-off gears on the right-hand end of the machine provide for changing the ratio of rotation of the work in relation to the drive shaft speed. There being six spindles at each end of the machine, 12 in all, the speed of rotation of the spindles around a common center, determines the output of the machine.

Equalizing cable shoes designed to compensate for uneven surfaces of the work held in the jig, are features. As the work revolves, with the work drum or spindles, the shoe is closed by the cable, which brings pressure to bear upon the work, thereby holding it in place. A spring mechanism at the rear of the machine, inclosed in the bed, serves to keep the proper tension on the cable.

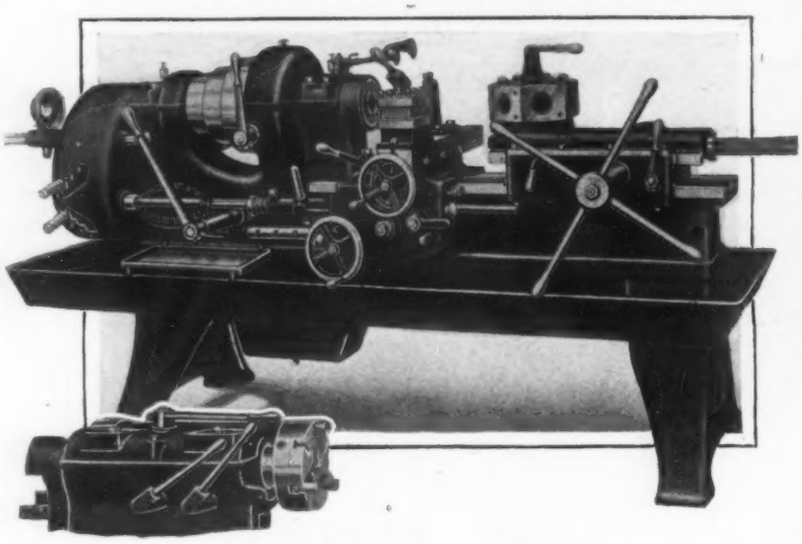
Provision can be made for lubricating the cutting tools through the spindle, as when threading nipples; water pump and pan are also available. Taper shank drills up to 15 in. long can be used. Both ends of the machine are covered in order to afford protection to the working parts. The putting of multiple heads on each spindle for the purpose of drilling bearing caps and for doing other work requiring two or more holes to be drilled, is now being contemplated. The weight of the drilling machine is about 8000 lb.

NEW HEXAGON TURRET LATHE

Production Machine for Parts from Bar Stock, Castings or Forgings

A No. 1 universal hexagon turret lathe for the high production of parts from bar stock, cast parts or forgings has been added to the line of the Acme Machine Tool Co., Cincinnati. The capacity is for 1½ in. round, 1 1/16 in. square and 1 5/16 in. hexagon stock. The swing over the bed is 18 in. and the length that can be turned, 9 in.

Eleven different tool stations are provided for boring, facing, turning, forming and other operations, and two or more tools can be in operation simultaneously according to the contour of the work. Both turrets, the main and the cross slide, may be operated simultaneously or independently, as both have separately controlled feeds.



Turret Lathe For Manufacturing Operation. Either cone or all-geared head can be provided, the latter shown in insert

The machine is available with cone head as illustrated, or with an all geared head, single pulley drive. The latter provides 12 speed changes from 18 to 318 r.p.m. and is of the sliding gear type, the changes being made through the two levers at the front of the headstock, shown in the insert. One lever controls four changes, the other three, and interchanging of the two gives 12 changes. Sliding and mating gears are of chrome nickel, and heat treated. Splash lubrication is employed. The stop and reverse lever is placed on the top of the head stock for convenience, as in the No. 2 universal lathe recently brought out. The head is cast solid with the bed.

The patented gear shifting device incorporated is similar to that of other of the company's machines and the automatic chuck is forged from the solid on the end of the spindle as in other of the company's machines. An extra capacity chuck for short work of large diameter is available.

The side carriage spans the ways of the bed eliminating overhang to the turret and tools. It is constructed to clear the chuck and can be moved out of the way to permit use of short tools when using the hexagon turret. Six independent stops for the longitudinal movement are provided. The square turret is mounted on the cross slide and is positioned by a hardened lock bolt located directly under the cutting tool. It can be indexed to four positions, a vertical movement of the top lever unclamping the turret and withdrawing the bolt.

The turret is hexagonal in form and is provided with six tool holes fitted with binder bushings, having also bolt holes for securing tools to the faces. Stock up to the full diameter of the hole can pass through the turret, permitting the use of short tools for long work. Like in previous machines it is indexed automatically by the backward movement of the turret slide, automatic independent stops being also provided for each turret face. Provision is made to permit the turret a slight movement beyond the stops, which are also arranged to trip the power feed.

The side carriage and turret are provided with separate feed shafts so that each may be operated independently. Eight feeds are provided for each, from 13 to 333 revolutions of the spindle for each inch of travel. Feeds to the side carriage may be reversed by means of a knob on the side of the apron. Six carriage stops are provided for the longitudinal movement and a large micrometer dial with observation stops for the cross movement. An independent automatically operated stop is provided for each turret face.

For the geared head machine a 2-hp. 1200 r.p.m. constant speed motor is required, and for the cone-head machine a variable speed, 500 to 1500 r.p.m., 2-hp. motor. With the variable speed motor a reversing drum controller is required. The floor space occupied is 2 ft. 4 in. x 6 ft. 10 in. and the weight of the machine 3150 lb. net.

Simplifying Metal Containers

WASHINGTON, Jan. 23.—Possible ways of simplifying metal containers were recommended by a standing committee, of which H. A. Baker of the American Can Co. is temporary chairman, last Wednesday, after a two-day conference held with the Division of Simplification. The conference dealt with food containers of all kinds, including metal, glass, wood and paper and fiber. After discussing various methods of standardizing containers, a survey in each field was planned, through the standing committees.

The recommendations of the metal container committee follow:

First, that this committee communicate with each commodity packaging industry, through the secretary of its national organization, and request that it appoint a committee to assemble all the data on the different sizes and styles of containers that are used in that particular industry with respect to certain type or types of commodities that may be grouped together.

Second, that a request be made to each of the same associations to collaborate with its wholesale and retail merchandise associations and container manufacturers in the matter of elimination and simplification in size of containers.

Third, that each national association using metal containers be asked to appoint a member of a central committee representing all such associations and furnish to this central committee all data gathered by each commodity industry for the purpose of still further elimination and simplification by combination of the possibilities of the combined simplified schedule.

It is the feeling of this committee that the central coordination committee will collaborate with the Department of Commerce and keep in touch with S. E. M. Crocker, of the Division of Simplified Practice, Department of Commerce.

Competitive examination for mechanical engineer for the Coast and Geodetic Survey, $3,000 per annum salary, has been announced by the United States Civil Service Commission, with the request that application be made for form 1312 and before Feb. 20. On March 7 and 8 an examination will be held for a structural engineer and draftsman for vacancies in the supervising architect's office of the Treasury Department.

James Hartness, Governor of Vermont and president of the Jones & Lamson Machine Co., and Dr. Samuel W. Stratton, president of the Massachusetts Institute of Technology, are announced as speakers before a banquet of the Providence Engineering Society, Feb. 7.

Alloy Steels for Structural Purposes*

Nickel, Nickel-Chrome and Silicon Steel in Bridges—Possibilities of Copper as an Alloy—Use of Heat-Treated Steel

It has long been considered a desideratum to find an alloying element which can be added to structural steel at low cost and increase its strength and elastic limit without lowering the ductility and without resorting to special thermal or mechanical treatment. It has also been considered by some engineers that the present type of structural steel might be improved considerably by refinements in manufacture without essential change of composition or appreciable increase in cost, thus making for greater uniformity of product which might allow of raising the permissible stresses.

For certain structural members also the possibility of raising the carbon content somewhat at the expense of ductility has been considered, which would make for reduction in weight; and, finally, two or more of these suggestions have been combined, as raising the carbon and also adding an alloying element, such as nickel, which tends to maintain the ductility, giving a satisfactory structural steel of considerably enhanced permissible stresses, say 28,000 lb. per sq. in. as compared with 16,000 lb. per sq. in.

A well-known factor that has to be taken into account in structural steel, when weight is decreased and stresses increased, particularly for structures such as the larger bridges subject to heavy and variable live loads, is the greater deflection and consequently decreased stiffness undergone by the structure. These effects necessarily accompany the use of higher allowable stresses for a material like steel, all of whose alloys show no change in the modulus of elasticity. This may in some cases be counteracted by introducing strains of opposite sign during fabrication; and for each type and design of structure there is undoubtedly a best practice to be followed for a given material. This phase of the question I shall not discuss, but confine myself to some of the metallurgical aspects.

Alloy Ingots and Defects

There are certain manufacturing characteristics generally common to all steels but in diverse degree, such as piping, segregation, effect of impurities, including oxides and gas inclusions, internal stresses and surface defects, but from which ordinary low carbon structural steel may be and often is singularly free. With the increase of carbon and especially with alloying elements in increasing amounts, it is more and more difficult and often impossible practically, to make steel ingots free from pipe, and these more complex steels are also usually more subject to other defects such as internal irregularities of composition and surface flaws, all this resulting thereby in greater manufacturing losses such as increased discard for pipe and rejection for variation in composition, properties, or condition of surface. In other words, as the complexity of the steel increases so do the difficulties and cost of manufacture with, in general, a corresponding uncertainty in uniformity of the product, necessitating also a more rigid inspection.

Keeping these facts in mind, we may proceed to a consideration of the modifications of structural steel by alloying and deoxidation, as well as the rôle of impurities.

Among the alloying or addition elements besides carbon that have been suggested, and in some cases used, are nickel, alone or together with chromium as for steel made from Mayari ores, vanadium, chrome-vanadium, silicon especially in association with higher manganese, aluminum which appears not to have been used except as a deoxidizer, and titanium. Other possibilities are copper and perhaps molybdenum.

At the outset, it is interesting to note that as far back as 1904 the Pennsylvania Steel Co. offered a special high carbon steel for structural work of the Manhattan Bridge to have an elastic limit of 45,000 lb. per sq. in., a tensile strength of 85 to 95,000 and an elongation in 8 in. of 1,500,000 T. S. per cent; this steel carried from 0.50 to 0.60 per cent Mn, 0.45 per cent C., together with low Si. The question naturally arises, cannot a carbon steel of higher yield point than shown in Table I be advantageously and safely used for structural purposes?

We may compare the above with the latest specifications, those of the proposed Sydney Harbor River Bridge, which has a central span of 1600 ft. These allow the contractor to use either carbon steel, nickel

(*Continued on page* 320)

Table of Some Structural Steel Specifications

Type	No.	Steel Process	Maximum Phosphorus Acid	Maximum Phosphorus Basic	Sulphur, Max.	Carbon, Max.		Nickel, Min.	Tensile Strength, Lb. per Sq. In.	Yield Point, Min., Lb. per Sq. In.	Elong. in 8 In. Min., Per Cent	D on 180° Cold Bend, ¾"	D on 180° Cold Bend, ¾"+	D on 180° Cold Bend, 1"
A.S.T.M.: Bridges	A 7-21	O.H.	0.06	0.04	0.05	...		...	55- 65,000	0.5 T.S.	(1) 27.3-18	1T	2T	3T
A.S.T.M.: Nickel	A 8-21	O.H.	0.05	0.04	0.05	0.45		3.25	85-100,000	50,000	(1) 17.6-14 R.A. = 25	1T	2T	
A.S.T.M.: Buildings ..	A 9-21	O.H. Bess.	0.06 0.10	0.06	...	...		...	55- 65,000	0.5 T.S.	(2) 25.4-18	0T	1T	2T
A.S.T.M.: Locomotives.	A 10-21	O.H.	0.05	0.05	0.06	...		...	55- 65,000	0.5 T.S.	(1) 25.4-18	0T	1T	2T
A.S.T.M.: Cars	A 11-21	O.H.	0.06	0.04	0.06	...		...	50- 65,000	0.5 T.S.	(1) 30 -18	0T	1T	2T
A.S.T.M.: Ships	A 12-21	O.H.	0.06	0.04	0.06	...		...	58- 68,000	0.5 T.S.	(1) 26 -18	1T	1½T	2T
Silicon	.....	O.H.	0.06	0.04	0.05	0.40	Si. 0.20 to 0.45 Mn. < 1.00		80- 95,000	45,000	(3) 20 -16.8	1T	1½T	
Mayári	.....	O.H.	0.06	0.04	0.05	0.40	Ni. < 1.20 Si. < 0.15 Mn. < 0.30		85-100,000	50,000	(3) 18.8-16 R.A. = 30			
British:														
Bridges	15-1912	O.H.	...	0.06	0.06	...		...	62,720- 73,920	.....	20 -16*		1½T	
Buildings	15-1912	O.H.	...	0.08	0.06	...		...	62,720- 73,920	.....	20 -16*		1½T	
Ships	13-1910	O.H.	...	...	...	...		...	62,720- 71,680	.....	20 -16*		1½T	

(1) Based on 1,500,000 T.S. (2) Based on 1,400,000 T.S. (3) Based on 1,600,000 T.S.
*For steel below 0.375 in. in thickness.

*From a paper "The Study of Steels for Engineering Structures," by Dr. George K. Burgess, U. S. Bureau of Standards, presented before the American Society of Civil Engineers at the annual meeting in New York, Jan. 19.

INDUSTRY'S PROBLEM OF LABOR

Remedial Measures Suggested by Charles Piez at Engineers' Meeting in Pittsburgh

The coal problem came in for major attention by Charles Piez, president Link-Belt Co., Chicago, in an address he made Jan. 22 at the annual banquet at the William Penn Hotel, Pittsburgh, of the Engineers' Society of Western Pennsylvania. The railroads of the country, he pointed out, consume about 25 per cent of the coal mined, and yet, by reason of the sad condition of railroad finances, they are either unable or reluctant to incur the expense of storage. Yet, said he, "stored coal, under certain safeguards, like those obtaining in warehouses, would be acceptable as collateral for loans, and I am confident that the railroads serving the coal mines would save money if they stored at least a 60 days supply, and released their coal cars in times of peak demand to supply the demand for domestic coal.

"The cost of storing is 30 to 40 cents per ton for the round trip, and this expense, plus the interest on the investment in coal, would be justified several times over by the earnings of coal cars released for paying service. With a total annual output of 450,000,000 tons, storage facilities for at least 50,000,000 tons located at or near the market would be necessary to equalize the load on the carriers and permit the efficient mines to get a sufficient car supply to operate with some degree of uniformity."

Meeting Needs for Industrial Labor

Mr. Piez took for his subject, "Some Problems of the Day." If public policy will prevent Congress from meeting the needs for industrial labor by removing the restrictions on immigration, then three steps, he said, should be taken:

1. Congress should be asked to modify the tests so that none except those that come here to work will be admitted. Let our immigration authorities advertise for labor in countries that have furnished us with readily assimilable material for citizenship in the past, examine them for the necessary tests before they embark, and then dispose of them quickly when they arrive at Ellis Island.

2. Improve industrial methods and enlarge the application of labor aiding machinery, so as to release labor for transfer to industries in which labor-saving machinery cannot be readily applied.

3. Find some method of improving conditions in industries that are known to be over-manned, so that the surplus labor may be diverted to industries that will offer better opportunity for employment.

The first of these three steps, he believes, could be solved promptly by Congress. The second step depends largely on the ingenuity of the engineering profession in improving processes and devices in industry.

"There still exists foolish opposition to the unrestricted use of labor saving devices in industries controlled by organized labor, and here the sound sense and unprejudiced reasoning of the engineering profession can help to wear away this opposition.

Coal Mining Problem

"The coal mining industry," he continued, "has in the last ten years been greatly inflated (154 per cent more mines in 1920 than in 1910), that the average output per mine has been reduced (only 37 per cent more coal produced in 1920 than in 1910) and the cost increased, and that free competition for supremacy in the market, and the weeding out of the inefficient mines, is absolutely stopped by the rule controlling the distribution of the available railroad cars. No matter how efficiently organized a mine may be, no matter how excellent its product, how capable its sales and distributing force, its business is limited, not by its ability to produce, or by the demand for its product, but by its ability to ship.

"If through a decided increase in storage of coal, a decided increase in the uniformity of operation at the mines could be secured, it would give more regular employment to the men in the industry, would result in higher annual earnings, with lower day rates and lower costs per ton, and would release at least one-third of the men now engaged for useful occupation in other industries.

"The European war gave rise to a wholly unjustified expansion of the coal industry, and this expansion has been maintained and fostered by the impoverishment of the railroads through unintelligent government control, by the rule of the Interstate Commerce Commission concerning the distribution of available cars, by discriminating wage rates fixed by the unions, and by the opposition of organized labor to the introduction and manning of labor-saving devices.

"Organized labor today absolutely controls a very large proportion of the coal production of the country. Nowhere has so complete a monopoly of labor been established and nowhere are the evils of monopoly so well illustrated."

MORE METAL WORKERS EMPLOYED

Increase of 12,418 in December in 328 Plants—Average Wage Slightly Down

WASHINGTON, Jan. 23.—For the sake of uniformity, the Bureau of Labor Statistics, Department of Labor, in December began tabulating on a weekly basis reports regarding employment, so that iron and steel and other industries formerly reported on a half-monthly basis now are shifted to the shorter period. The report for December shows that 133 iron and steel establishments employed 195,602 workers, an increase of 2.6 per cent over November, the weekly payroll amounting to $5,474,043, an increase of 2.9 per cent over November, when the total number of employees was 190,728 and the weekly payroll was $5,319,324. A much sharper increase is shown in iron and steel employment when figures for December, 1922, are compared with those for December, 1921. For 105 establishments the number on the payroll was 146,358, an increase of 26 per cent over December, 1921, the weekly payroll, amounting to $4,027,555, showing an increase of 65.8 per cent over the payroll of December, 1921. During the latter month the number on payroll in the identical establishments was 116,132, the weekly payroll being $2,428,833. The per capita earnings in the iron and steel industry in December, 1922, showed an increase of 0.4 per cent over November.

Wage adjustment was reported in one iron and steel establishment between Nov. 15 and Dec. 15, representing increase of 13.4 per cent and affecting 10 per cent of the employees.

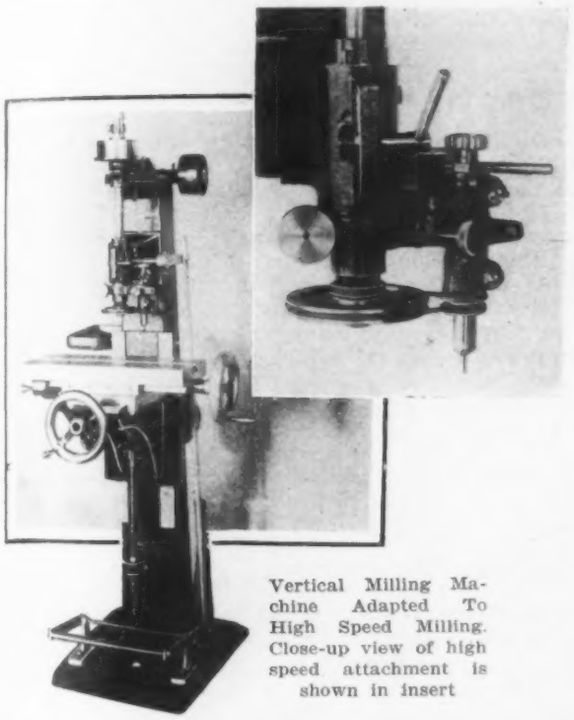
Employment in December, 1922, in 3294 representative establishments in 43 manufacturing industries, covered 1,587,708 employees, whose total wages during the one-week payroll period amounted to $40,174,295, an increase over November of 2.4 per cent in the number of employees and of 3 per cent in the total payrolls. November employment in the same establishments amount to 1,551,080 employees, with a total payroll of $39,017,717. Among industries showing the greatest increase in employment were agricultural implements, 14.8 per cent; car building, 4.2 per cent; foundry and machine shops, 4.5 per cent; and steel shipbuilding, 7.7 per cent. Details are shown in the table.

Period	Number of Establishments	Number of Men	Week's Payroll	Average Pay Envelope
Iron and Steel				
Nov., 1922...	133	190,728	$5,319,324	$27.89
Dec., 1922...	133	195,602	5,474,043	27.99
Dec., 1921...	105	116,132	2,428,833	20.91
Automobiles				
Nov., 1922...	111	165,762	5,551,731	33.49
Dec., 1922...	111	170,229	5,352,947	31.44
Dec., 1921...	46	96,091	2,528,627	26.31
Car Building and Repairing				
Nov., 1922...	84	73,726	2,108,289	28.60
Dec., 1922...	84	76,803	2,192,556	28.55
Dec., 1921...	55	42,619	1,211,766	28.43
Metal Workers (the three groups above)				
Nov., 1922...	328	430,216	12,979,344	30.17
Dec., 1922...	328	442,634	13,019,546	29.41
Dec., 1921...	206	254,842	6,169,226	24.21

Miller with High Speed Attachment

A vertical milling machine with high speed attachment, and of the same construction as its No. 1 miller, except that the feed is controlled by a foot treadle and the table and cross screws are provided with hand wheels instead of ball handles, has been placed on the market by H. M. Clough, Meriden, Conn.

The spindle has a No. 7 B & S taper hole. The stop gage for the spindle is located on the upper end of the sleeve instead of on the spindle. A detail view of the high speed attachment is shown in the insert. It is clamped on the lower end of the sleeve and may be quickly attached or removed. The speed is four times



Vertical Milling Machine Adapted To High Speed Milling. Close-up view of high speed attachment is shown in insert

that of the main spindle, 5000 to 10,000 r.p.m. being available. The attachment is driven by a round belt running in a V-grooved pulley, which is mounted on the spindle as shown, and a screw is provided for adjusting the tension of the belt. The spindle is hardened and runs in a babbitt bearing which is adjustable for wear. It is equipped with a draw-in rod and a small chuck for holding 3/16 in. mills and smaller. The attachment is adaptable to other machines.

Reclaiming Light Scrap Iron and Steel

Utilization of light scrap metal, such as sheet scrap, trimmings, trim from adding machines, cash registers, automobile bodies, etc., has long been regarded a problem not yet thoroughly solved. Ordinarily it is difficult to handle in a way satisfactory to open-hearth operators, by whom it has heretofore had to be used as a part of the raw material for the making of open-hearth steel. A method of working up this material has been developed by Llewellyn Jones of the Vulcan Iron & Steel Corporation, Muncie, Ind. It does away with the necessity for melting it, but makes use of it, after proper heating, in the re-rolling of steel or iron bars or billets from compressed masses of the fine pieces. This is similar in some respects to the method which has been used for so many years in the preliminary stages antecedent to the rolling of wrought iron bars. A somewhat similar process is used also in reclaiming horseshoes and other like materials, and re-rolling them into new iron bars, but neither of these two processes makes use of the compressing of the material while cold.

As no remelting is done, the new product retains whatever alloy may be in the old. The light scrap is placed under a hydraulic press and compressed into "slugs" of 80 to 150 lb. weight each. These slugs are then fed into a heating furnace and slowly brought up to rolling temperature, after which they are handled in the customary way. Steel turnings, borings and other material are included in the slugs, being compressed into a compact mass by the action of the hydraulic ram. In this way, the scrap or busheling or faggot method of working is done away with.

It has been estimated by the company that the new method will permit the production of bars from old material at a cost below that of standard material on the market. A large part of the saving comes from the fact that the metal is not remelted, with consequent material loss and extra fuel consumption. Bars made under the Jones process, which has been patented, are reported to show a fibrous structure similar to that of wrought iron and quite different from the granular structure of steel.

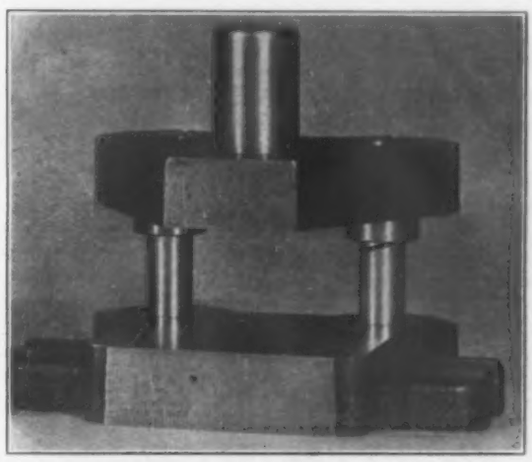
An economy in the production of bar iron and steel from machine shop turnings and scrap; a uniformity of chemical composition, a homogeneous product and high tensile strength are expected to follow the compressing of cold scrap of differing chemical compositions into slugs or billets by the use of hydraulic pressure, the treating of these slugs or billets with a flux to remove impurities and then their rolling into solid bars after being properly heated.

Line of Standard Die Sets

Standardized die sets in a variety of sizes, and in styles applicable to holding dies of practically all types, are being marketed by the Danly Machine Specialties, Inc., 1613 North Lincoln Street, Chicago.

The die sets are equipped with leader pins, intended to assure alinement between punch and die, prevent shearing of the die, and produce more accurate and cleaner stampings. Semi-steel castings are used in the punch holder and die shoes, and the castings are machined, accurately ground to size and parallel. Leader pins and bushings are square to the face of the shoe and punch holder, and lapped to correct fit without perceptible "shake."

The front and rear of the die shoe and punch holder



Standardized Die Set. Leader pins are of alloy steel, carbonized; hardened and ground on centers to plus or minus 0.0002 in.

are machined parallel to the leader pins and bushings to facilitate any layout for die or punch pad. This allows a surface to clamp by when machining the slot to let in the die or punch pad, and permits of room for the stamping part number or other identification record.

The punch holder and die shoes are interchangeable and replacements are quickly available. The die set illustrated is the style B.

The Detroit Employers' Association reports a total of 189,236 employed as of Jan. 9, this being a gain of 5214 over figures given a week ago by the 79 members of the association. It is the consensus of opinion that production today is above the peak of 1920 when 200,000 men were employed. A year ago, the association reported 102,485 men.

WOMEN IN STEEL MILLS

Numbers Increasing Rapidly, Census Report Shows —Pre-War Movement Accelerated

According to bulletin No. 27 of the Women's Bureau of the Department of Labor, the iron and steel industries as a whole employed 70,410 women in 1920 as compared with 29,697 in 1910. This included a wide variety of industries covering plants using iron and steel as the principal material of manufacture. Thus, the automobile factories accounted for 12,788 women as semi-skilled operatives in 1920, only 848 being similarly employed in 1910. This showed an increase of 1408 per cent.

In blast furnaces and steel rolling mills women operatives numbered 4101 in 1920, or nearly twice as many as in 1910. It should be explained that, while these women were not employed in actual operation of either the furnaces or the mills, they were employed in certain departments attached to such plants and, therefore, returned as being in iron and steel manufacture. The number employed in iron and steel factories and foundries manufacturing machinery and other iron and steel products was 36,338, or an increase of 126.5 per cent over the 16,043 of 1910.

Other mechanical industries in which the number of women more than doubled between the two census years include coal mine operatives, increasing from 405 to 1495; laborers in brass mills, increasing from 279 to 871; laborers on steam railroads, increasing from 3248 to 6586; laborers in electrical supply factories, increasing from 1381 to 3227; laborers in factories making tin ware, enamel ware, etc., increasing from 878 to 2169; semi-skilled operatives in car and railroad shops, increasing from 377 to 976; semi-skilled operatives in electrical supply factories, increasing from 11,041 to 27,389.

Although the census was taken only 14 months after the close of the war, and the industrial prosperity due to the war still existed, the fact must not be overlooked that there was a great increase from 1900 to 1910 in the number of women employed in the iron and steel industries, indicating that women were already firmly established there even before the war, and that the industrial upheaval due to the war served only to accelerate a movement already well under way.

Molders Demand Advance

The International Molders' Union of North America has presented a demand for an advance of 50c. per day, from $5.50 to $6, to the union shops in Cincinnati. The foundrymen are reported to be favorably inclined toward granting the increase, and the indications are that it will be granted at a conference to be held this week. The present contract expires on Feb. 19, and it is probable that the new wage contract will be effective for one year from that date. Molders' wages generally have been advanced to $6 per day throughout the State.

The Eight-Hour Day in Belgium

That all is not well with the 8-hr. day movement is apparent from the resolution recently passed by the Comité Central Industrial of Belgium, an organization which includes most of the chief employers' associations in that country, says the *Metal Bulletin* of London. After an exhaustive investigation the Comité declares that the legal restriction of the working day to 8 hr. is a menace to national industry and that a full year's experience of the law warrants steps being taken for its repeal. It is stated that Belgian industry is handicapped because other countries are not burdened with such a law. To this legal restriction of individual effort is laid blame for the insufficient coal output, which involves the importation of large quantities of fuel from abroad; the departure from the country of large numbers of skilled workmen who consider the law an interference with their labor liberties; increased working costs of production arising from the employment of extra labor, much of which is foreign and only partially skilled; and the continued depreciation in the value of the Belgian franc arising from the decreased sale of Belgian goods abroad and involving, in turn, increased cost in the price of commodities.

In a number of cases employers' associations declare that the application of the law is either totally impracticable or else involves such high payments that the earning of profits is impossible, while in the case of export sales, contracts are often only obtainable on terms precluding compliance with the law. It is suggested that the length of the working day should be the matter of arrangement between the employers and the trade unions.

Export Managers to Meet

The annual meeting of the Export Managers' Club of New York will be held March 20, at the Pennsylvania Hotel, New York. The slogan for the 1923 meeting is "Common Sense in Exporting." In the morning, under the chairmanship of C. J. Warren, foreign sales manager of the Remington Typewriter Co., the following subjects will be discussed: Getting Results from the Sales Budget, presented by Walter F. Wyman, Carters Ink Co.; Building Sales Through Service, presented by H. L. Gemberling, Sherwin-Williams Co.; and Manufacturers' Representative versus Merchant Distributer, by Ernest Filsinger, Lawrence & Co.

At the afternoon session of the convention with Stanley H. Rose of the Barber Asphalt Co. as chairman, the problem of marine insurance will be treated by Peter Moora, Patton-Pitcairn division, Pittsburgh Plate Glass Co. Discounting Drafts versus Collection will be treated by L. R. Browne, International Electric Co. A round table discussion on standardization of practices will be led by Harvey E. Golden, General Fireproofing Co. A dinner will be held in the evening. University professors and students of export trade and advertising have been invited to attend the convention.

Cleveland Engineering Society

Clarence L. Collens, 2d, president Reliance Electric & Engineering Co., Cleveland, addressed the Cleveland Engineering Society, of which he is president, at a luncheon meeting, Jan. 19, giving some impressions he gained on a European trip from which he has just returned. He said that in France business conditions are very good, probably because of the reconstruction work, but about the only demand for American goods in that country is for specialties and that he did not expect much change in that respect until the rate of exchange gets back to nearly normal. He found business in England very bad and believes that there is not much chance for standard American products in that country, as the English prefer to buy home-made goods to help relieve the present industrial situation and the large amount of unemployment. He said wages and cost of living had each advanced about 85 per cent in England, so that the condition of the wage earners has not improved.

Mr. Collens went abroad to attend a meeting of the International Electro-Technical Commission in Geneva, Switzerland.

Officers of the Engineers Society of Western Pennsylvania for 1923 are Morris Knowles, president; W. B. Spellmire, Pittsburgh district manager, General Electric Co., vice-president; A. Stucki, treasurer; K. F. Treschow, secretary. E. D. Leland and Frank I. Ellis have been elected directors.

COMING MEETINGS

February

American Society for Steel Treating. Feb. 15 and 16. Winter sectional meeting, City Club, Chicago. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, Ohio, secretary.

American Institute of Mining and Metallurgical Engineers. Feb. 19 to 21, inclusive. Annual meeting, Engineering Societies Building, New York. Dr. F. F. Sharpless, 29 West Thirty-ninth Street, New York, secretary.

TROPHY FOR SAFETY WORK

Awarded Monthly Among Plants of Carnegie Steel Co. for Accident Reductions

The Carnegie Steel Co. has placed in competition among its eighteen plants a safety trophy for the year 1923. This is the second trophy the company has developed in its safety work since it adopted a plan of competition several years ago. This trophy, done by Giuseppe Moretti, a Pittsburgh sculptor, embodies the symbolic as well as the practical in its thought. It is of bronze, 32 in. high and 20 in. in diameter through

Eighteen Divisions of the Carnegie Steel Co. Will Compete Monthly to Secure Engraved Credit on the Trophy and at the End of a Year to Keep the Trophy

the base. The imposing figure is an open hearth furnace steel ladle, which in active operation about a steel plant would carry from 100 to 125 tons of molten metal. The trophy portrays the ladle carried on the shoulders of four workmen, two of whom are led and guided by the female figure, typifying safety. The two other figures of the workmen bear the rear corners of the ladle's cradle. On the reverse side of the base and between the rear figures is cast in relief the words: Carnegie Steel Company, Safety Trophy, 1923.

Between the forward and rear figures on each side of the base are plates which will be engraved with the names of the months of the year and the name of the plant winning it each month.

The basis of award is upon the greatest percentage of reduction of accidents causing lost time (compared with the number of hours worked), as compared with the same record for the five preceding years. Each month the plant record is computed and the winner for the month holds the trophy for the following month. At the end of the year the year's record determines the perpetual holder of the trophy.

During the competition the monthly holder of the trophy is privileged to flaunt the victory by displaying from the plant flagstaff a long green pennant, similar in shape and size to the homing pennant flown by a warship when returning from a foreign station. Green is the color adopted for this pennant, because it is the established color of the National Safety Council and is recognized as the official color in safety work throughout the country. Only the plant holding the trophy is permitted to display the pennant.

The Carnegie Steel Co. plants that are in competition for the trophy are: Edgar Thomson Works, Braddock, Pa.; Duquesne Works, Duquesne, Pa.; Homestead Steel Works, Munhall, Pa.; Clairton Steel Works and By-Product Coke Works, Clairton, Pa.; New Castle Works, New Castle, Pa.; City Mills, the original mills of Andrew Carnegie, located in Pittsburgh city limits; City Furnaces, the blast furnace units within the city of Pittsburgh; Farrell Works, Farrell, Pa.; the several units at Youngstown, Ohio; the Columbus, Ohio, plant; the Mingo Junction, Bellaire and Steubenville, Ohio, units and the Union Railroad, the interplant system of transportation.

British Steel Shares and the Industry's Revival

The improved outlook in the British steel industry is being reflected in the value of the shares of the iron and steel companies. The National Federation of Iron and Steel Manufacturers publishes a table which shows the ratio of the market value to the nominal value of iron and steel shares. A portion of the table follows:

Date	Iron and Coal Companies (6)	Iron, Steel and Engineering Companies (9)	Iron and Steel Companies (24)	Total (39)
March 31, 1920.	160.7	180.8	148.0	163.9
Feb. 14, 1922..	102.9	75.9	73.8	79.0
Sept. 29, 1922..	114.0	97.7	76.9	91.1
Nov. 14, 1922..	122.3	104.9	81.6	97.4
Dec. 14, 1922..	124.7	117.1	87.6	105.6

The index number for the 39 companies stood at 163.9 on March 31, 1920, which was the peak. It has slowly fallen until it stood at 79.0, or less than half, on Feb. 14, 1922. Since then this index number has fluctuated between 80 and 98, never rising above par until early last December at 105.6 or the highest since December, 1920. The advance has not been confined to a few companies but has been spread over most of the iron and steel and engineering companies whose shares are publicly quoted.

Columbia Steel Corporation to Build a 33-Oven By-Product Coke Plant

PITTSBURGH, Jan. 22.—The Columbia Steel Corporation, San Francisco, has placed a contract with the Koppers Co., Pittsburgh, for a by-product coke plant at Salt Lake City, in connection with a blast furnace which is to be erected there. The plant will consist of 33 ovens of the new Koppers type, having a daily carbonizing capacity of 1000 tons of coal. The plant will run on Utah coal and this will mark the first attempt to carbonize Utah coal in a commercial way in by-product ovens. Construction will begin immediately and it is expected the plant will be completed in about a year.

The Koppers Co. also will construct for the Battle Creek Gas Co., Battle Creek, Mich., a coal gas plant consisting of 11 by-product gas ovens of the new Koppers type and a Koppers gas producer equipped with a waste heat boiler. The ovens will be 13½ in. wide and have a capacity of approximately 6¾ tons per charge. Based on coking speed of 12 hours, the plant will have a capacity of 1,500,000 cu. ft. of gas per day when heated with producer gas. The producer will utilize coke breeze to produce the necessary gas for oven heating, releasing all of the coal gas for distribution. Provision has been made for instantly changing the heating of individual ovens or the entire plant from producer gas to coke oven gas, insuring the greatest possible flexibility.

Reported activities of the Ford Motor Co., which have not been officially announced, cover the purchase of 170 acres of land on the Mississippi River, between St. Paul and Minneapolis, at the site of the United States dam and a proposed manufacturing and assembling plant at St. Louis. The estimated cost of the St. Paul project is $10,000,000.

Last year industries at Youngstown, Ohio, distributed $54,046,482 in wages, comparing with a disbursement of $50,384,741 in 1921 and $95,247,736 for 1920, which was the banner year. With a wage disbursement of $6,120,617, December was the highest month in 1922.

CABLE ARMORED BY HEAVY WIRE

World's Longest Submarine Power Transmission Cable Successfully Laid

BY CHARLES W. GEIGER

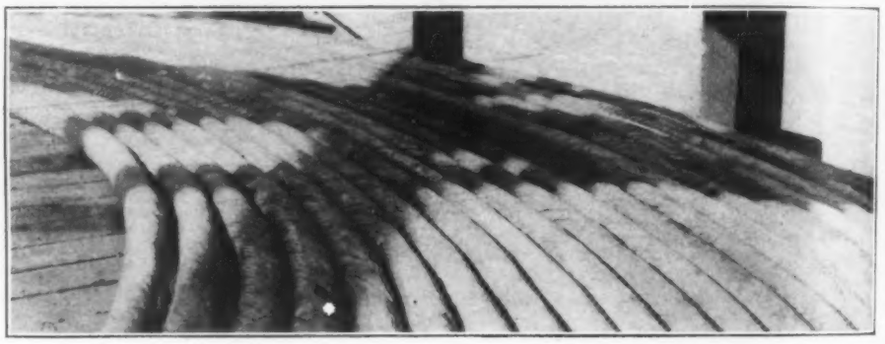
HEAVY wire is used to armor the submarine power cable which has just been stretched under San Francisco Bay by the Great Western Power Co. This cable is said to be the longest, to have the highest capacity and greatest voltage, of any submarine power cable in the world. It is eight miles in length and carries 15,500 hp. at 11,000 volts from the new Golden Gate substation, near Richmond, to the company's distributing system in San Francisco.

Several important engineering problems were solved in the undertaking. One was the transmission of this great power under the water without leakage. Another was the splicing of the cable ashore, the splicing being reinforced with a steel sleeve. The cable is 4 in. thick. Within its armor of heavy wire are three power cables, packed in jute, and three pairs of telephone wires. Each power cable is composed of a large number of separate insulated wires, and the cable weighs 20 lb. to the foot.

It required nine freight cars to transport the cable, in as many lengths, from the mills of the American Steel & Wire Co. at Worcester, Mass. Special mechanics were brought to attend to the splicing. The whole cable, weighing 500 tons, was then coiled on a barge and led over a chute at the stern. A dozen workmen guarded the unwinding of the cable to prevent kinking. Eight brakes, wooden shoes attached to levers, checked its progress over the stern. Three hours were required in laying.

Laid at a total cost, including freight, labor and insurance, of about $200,000, this cable will take the place of working a transmission line around the southern end of the bay, which would cost, it is estimated, at least $1,000,000.

At Left Is the Barge, under Tow from a Tugboat, at Work Laying the Cable, Which Appears at Extreme Left. The speed of nearly three miles per hour resulted in laying eight miles of cable in three hours



At Right Is a Portion of the Cable as Coiled in Wide Sweeps on the Deck of the Barge. The wire strands wound spirally on the cable appear clearly. The cable is 4 in. in diameter

Navy Bureau of Yards and Docks

Evidence of the effects of the conference on limitation of armaments is seen in the annual report of the Bureau of Yards and Docks for the fiscal year 1922. Expenditures for the year, under the direction of this bureau, aggregated $20,800,847, as compared with $30,057,700 in 1921. Contracts for public works to the number of 182 were awarded during the year and 268 were closed, leaving 86 fewer under way at the end of the year than at the beginning. One of these contracts is for metal bookcases to house the entire Navy Department library in the new Navy Building in Washington.

In accordance with the Department's order of Feb. 9, 1922, suspending the activities of the Naval Ordnance Plant at South Charleston, W. Va., work there was curtailed. At that time, however, nearly all of the contracts for buildings and equipment had been brought so near to completion that it was more economical to finish them than to settle them unfinished and provide special means for preserving the unfinished work. The close of the year, therefore, saw the practical completion of the entire plant, except such work in the gun treatment building as it was possible to eliminate by the non-completion of the vertical furnaces and the quenching tank.

As it stands, the armor and gun plant is believed to be superior, both in layout and equipment, to any commercial plant devoted to similar purposes in the United States. So far as is known, there is no European establishment so well prepared to make armor.

President W. M. Horner's Principles

At the annual meeting of employees of the Mahr Mfg. Co., Minneapolis, W. M. Horner, president, delivered an address on "Our Platform." In brief, Mr. Horner states his principles as follows:

I believe in private ownership supplemented by well-thought-out profit sharing plans because they both promote initiative and progress.

On the other hand, I believe in meeting radical views by adopting their workable ideas because that also means progress and it gives a diplomatic vantage point from which to subordinate and curb their unworkable and visionary ideas.

The operation of a modern business, like the conduct of a physician's clinic or a legal organization, is a combination of practical methods, scientific procedure and technical or vocational training reinforced by enterprise and intensive effort.

Poor Prospects of Upper Silesian Industry

Unfavorable Conditions for Iron and Steel Making—Economic Consequences of Partition of Country Between Poland and Germany

WASHINGTON, Jan. 23.—Discussing the status and prospects of Upper Silesian industry, Commercial Attaché C. E. Herring, Berlin, has prepared and sent to the Department of Commerce an interesting report dealing with the economic consequences of the partition of Upper Silesia between Poland and Germany, as it affects the iron and steel and related industries, transportation and natural resources. Mr. Herring reports that the prospects for the iron and steel industry on both sides of the border are distinctly unfavorable and that the economic situation on the whole hardly justifies optimistic predictions for the future. He points out that the iron and steel industry was already artificially sustained and its separation from the German economic structure may result in its gradual extinction when the present sellers' market is ended by a stabilization of the mark or otherwise. Production is now said to be less than 50 per cent of the output of 1913, which was about 1,000,000 tons of pig iron and 1,380,000 tons of steel blooms.

The Zinc Industry

The zinc industry, representing more of a natural monopoly, so far as Central and Eastern Europe goes, it is stated, will doubtless continue to produce at the present rate, estimated at about 50 per cent of pre-war output, or may even increase its output. The possibility of severe German competition with Polish Silesian smelters through new plants that may later be constructed in Germany must, however, always be considered.

When transportation facilities between Polish and German Silesia and between Polish Silesia and its hinterland are improved, it may perhaps be assumed that Silesian coal and coke will be produced in normal quantities, says Mr. Herring, but here also the possibility of the intensive exploiting of the rich deposits in German Lower Silesia, with coking coal comparable to that of the Ruhr Valley, must be considered.

In appraising the future of Silesian industry the anomaly of continued German control on the present scale in the Polish area together with the effects of its possible displacement, is declared to constitute a most important fundamental and indeterminate factor.

Significant Features

In his discussion, Commercial Attaché Herring says in part:

"The chief features of economic significance in the partition of Upper Silesia between Poland and Germany are the transportation question, the substitution of Poland for Germany as a natural market for coal, steel, zinc and other products of the Polish industrial area, the continued financial control of important industries, now in Poland, by German capital, and the necessary presence, for a time at least, of large numbers of German technical men, directors and, to a less extent, operatives, in spite of the almost inevitable disinclination of the Polish Government and the Polish local population to have them.

"The compactness of the Upper Silesian industrial area is comparable to that of the most highly concentrated regions in the Manchester district of England or the Bethlehem district of Pennsylvania. Coal mines, coke ovens, zinc mines, zinc smelters, blast furnaces and rolling mills, with their dependent towns and villages, form a continuous line from Gleewitz on the west to Kattowitz on the east, a distance of about 25 kilometers, the area having a width of from 12 to 15 kilometers. There is an extreme degree of interdependence, particularly since the same companies frequently control one or two coal mines, one or more zinc mines, and perhaps a blast furnace or two. This industrial region is highly self-contained, as Upper Silesia is separated from central and western Germany by long stretches of agricultural and forest lands and is equally far removed from sources of raw material and markets for finished goods on the Polish side of the border. Moreover, the railway communication between Polish Upper Silesia and its hinterland is very inadequate, largely owing to the former Russian policy of preventing close communication between West Poland and the potential military foe, the German Empire.

New Borderline

"Through the center of this highly concentrated and self-contained industrial area, the new international borderline has been drawn. Blast furnaces a kilometer or two away from their coal mines and zinc smelters two or three kilometers distant from their ore deposits are now separated by the frontier. The largest city in the region, Kattowitz, whose German complexion was indicated by a large majority in the plebiscite, is in Polish territory, while villages a few kilometers away which voted heavily for inclusion in Polish territory remain within the borders of Germany.

"Apart from the strictly economic factors mentioned above, the psychology of an industrial population living in such a confused atmosphere of racial antipathy must be considered in connection with the immediate future of Upper Silesian industry. Inevitable aggressions and reprisals on both sides of the border, which neither the German nor the Polish governments can entirely control, can hardly contribute to really efficient industrial production.

"There is perhaps no recent parallel for this artificial separation of a natural economic area by an international frontier. Such an international area exists, of course, in the French-Belgian border or in the Saar Valley, but complete control by alien capital is in both instances lacking, and political international friction accordingly discounted."

The difficult transportation situation is dwelt upon by Mr. Herring, who points out that the continuous complaint of German Upper Silesian industry and by the entire German area dependent on Silesian coal is the shortage of fuel. He points out that the partition of the territory has brought about confusion augmented by the lack of adequate terminal facilities and custom houses at the new frontier and shortage of rolling stock. The German proposal for the temporary running of the railroads in the whole industrial area so far has met with no favorable response on the part of the Polish government.

Would-be Purchasers

Denoting the antipathy of the German population toward the Poles, it is pointed out by Mr. Herring that there is a continued influx of would-be purchasers from the Polish areas into Beuthen and Geliwitz, and other towns on the German side, and nearly all the shops in the latter area display notices to the effect that no sales will be made to "foreigners" unless an export license can be produced. It is stated that industrial plants on the Polish side also claim to be embarrassed by the much higher cost of new equipment, practically all of which comes from Germany, such purchases now being subject to Polish customs duty. This embarrassment is the more serious, they contend, because Upper Silesian industry has not renewed its working equipment since the war to the extent that German industry in general has done, owing to uncertainties of the future with the pending plebiscite and League of Nations decision.

The other great obstacle resulting from the partition is the inevitable conflict between German capital,

with consequent German executive and technical direction, in Polish Upper Silesia, and Polish politics and sentiment.

It is pointed out that coal production has declined from 43,000,000 tons in Upper Silesia in the year 1913 to 16,184,605 tons for the first six months of 1922, which is at the rate of practically 33,000,000 tons a year. In August, last year, Polish production decreased 24.3 per cent and German production 12.5 per cent from the average monthly production of 1913. The separation of German and Polish Upper Silesia took place in June, 1922.

Unfavorable Outlook

Discussing the steel industry the commercial attaché says:

"The prospects for the Upper Silesian iron and steel industry on both sides of the border are distinctly unfavorable. The Silesian iron ore fields have long since reached the stage of diminishing returns, producing only about 135,000 tons of ore in 1913, and the industry has been increasingly dependent on Swedish and Westphalian ore. Furthermore, the quality of Upper Silesian coke is very inferior, it being stated that Ruhr coke has from two to three times the heat value of the former. The shortage of scrap in this part of Germany and the very high prices are a further difficulty.

"The Upper Silesian iron industry was artificially created, having been established by Frederick the Great, without reference to sound economic factors, in order to insure an adequate ordnance supply upon the Russian frontier. Since that time, it has been more or less artificially sustained, its inclusion in the German iron and steel cartel and its enjoyment of the preferential German railroad rates and the German protective tariff having insured its continued existence before the war.

"All these advantages have now disappeared. Competition with Ruhr metal products in the German market would be practically impossible under normal conditions; now that no preferential railroad rates from Westphalian ores and for the shipment of finished products to interior Germany are available, production costs must exceed those of the west German industry. Under present conditions, the 'flight from the mark' and the abnormal shortage of iron and steel in Germany, of course, make temporary sales of Polish Silesian iron and steel still possible; but the continuance of Germany as a market for Polish steel on the same scale as before the partition can hardly be permanent.

"On the other hand, it seems doubtful whether the Polish market can absorb the normal product of the Upper Silesian foundries and rolling mills, particularly in view of the present inadequate transportation facilities to the Polish hinterland previously referred to. A restoration of Russian purchasing power might, however, favorably affect the Silesian steel industry.

"The accompanying tables show the division by unit of coal mines, zinc mines, smelters, iron ore mines, foundries and rolling mills between German and Polish Upper Silesia, and the 1913 production in Polish and German Upper Silesia, both from German sources. The greater proportion of the coal production now occurs in the Polish area, and all the zinc smelters are located in Poland, while the zinc ore deposits, if potential production is considered, are more evenly distributed.

"Production of coal in Polish Upper Silesia was estimated at 32,506,300 tons in 1913, and in German Upper Silesia at 10,297,800 tons the same year. This proportionate production is at present somewhat changed, owing chiefly to transportation difficulties in Polish Silesia."

Division of Industrial Establishments Between German and Polish Upper Silesia (a)

Kind of Establishment	Number of Plants Now in— German Upper Silesia	Polish Upper Silesia
Coal mines	15	56
Zinc and lead mines	5	11
Iron foundries	10	15
Blast furnaces	3 (b)	5 (c)
Rolling mills	5	9
Zinc foundries	..	12

(a) Data from memorandum prepared by German Foreign Office, No. 23. xl. 1922.
(b) Works include 12 to 16 furnaces.
(c) Works include 21 furnaces.

Division of Production of Certain Commodities in German and Polish Upper Silesia
*(1913 Production in Tons)

Commodity	German Upper Silesia	Polish Upper Silesia
Coal	10,297,800	32,506,300
Iron Ore	4,200	130,200
Zinc Ore	94,300	426,800
Coke	1,118,900	1,146,300
Pig Iron	476,500	518,100
Steel Blooms	379,500	1,003,300
Rolled Steel:		
Half fabricated	235,600	123,400
Fabricated	192,100	874,400
Zinc	.....	167,900

* "Wirtschaft und Statistik," October, 1921.

Truscon Steel Co. Meeting Receives Encouraging Reports

That 1923 will be an active building year and will require large tonnages of steel products entering into construction was the consensus of opinion recently at the annual sales convention of the Truscon Steel Co., held at Youngstown, where the company's principal offices and properties are located. "We face the largest year in the history of our business," Gustave Kahn, vice-president in charge of sales, told the sales representatives assembled.

Trade problems were discussed in an intensive way, while present-day engineering tendencies also received their share of consideration. Discussion was devoted to each of the principal products which the company manufactures.

E. A. Silagi, Far Eastern manager of the Truscon company, traveled 11,000 miles to attend the convention, coming from Shanghai, China. Trade conditions in the Far East are returning to normal, he stated, and the buying power of the people is improving.

The Truscon company maintains a plant in Japan, which imports semi-finished steel from the United States. It employs about 500 workmen. Though the wages paid Japanese workmen are about one-half what American workingmen receive, their efficiency is only one-fourth as great. Production costs on this account are about one-third higher than in this country, stated Mr. Silagi. "The Japanese are not adapted to steel work," he said. "They need breathing spells every two hours, have too many holidays and when they save a few dollars, take a long vacation."

Ready-made warehouses of steel construction are among the principal products sold by the Truscon company in the Far East, though it also supplies many other steel building products. In some sections, particularly in the Dutch East Indies, German competition is strong.

Year's Production of Portland Cement

Showing an increase of almost 16 per cent over 1921, the output of Portland cement in 1922 is reported by the United States Geological Survey at 113,870,000 bbl., compared with 98,293,000 bbl. the year before and about 100,800,000 bbl. in 1920, the previous high record. Production was maintained throughout the year, for each of the three last quarters showed more than 31,000,000 bbl., the maximum of 34,645,000 being reached in the third quarter.

Shipments exceeded production by 2,693,000 bbl., resulting in reducing stocks by the same amount and leaving a stock total at the end of the year of 9,134,000 bbl. Shipments in the third quarter were more than one-third of the total, amounting to 40,655,000 bbl.

The Philadelphia Foundrymen's Association, Inc., has elected new officers for 1923 as follows: Frederick M. Devlin, Philadelphia Hardware & Malleable Iron Co., Philadelphia, president; C. R. Spare, American Manganese Bronze Co., Holmesburg, Pa., vice-president; William G. Summers, Phoenix Iron Co., Philadelphia, treasurer; and Howard Evans, J. W. Paxson Co., Philadelphia, secretary.

Union Abandons Connellsville Strikers

Benefits Withdrawn and Long and Futile Struggle Ended —Bitter Feeling Against Leaders Who Encouraged Men to Hold Out

UNIONTOWN, PA., Jan. 22.—Efforts of the United Mine Workers of America to organize the Connellsville coke region came to an end last Thursday with the official abandonment by the union of the strikers who have remained loyal to the union cause.

Despite eulogistic resolutions passed at the New Salem convention, when the strike was officially called off, men in the region are bitter against the union and against the leaders who persuaded them to make the futile fight. A meeting was held at New Salem Friday attended by some 1000 men in an effort to "devise ways and means," although no action was taken. Officials are investigating reports that Communist or I. W. W. workers are in the region attempting to capitalize the situation.

Van A. Bitner, former president of District No. 5; International Organizers Feeney and O'Leary and Board Member Hynes, submitted the report of the international executive board to the New Salem convention. This report announced that benefits for the strikers would be withdrawn and recommended that the strikers be permitted and urged to secure employment. The report urged, however, that the men retain their membership in the United Mine Workers of America.

Best estimates are that 3000 workers are affected by this order. It is estimated that there were about 17,000 members of the union at the peak of the strike in the coke region.

Union representatives say that the U. M. W. A. has spent $614,000 in the effort to organize the coke region.

Chance to Get Jobs

It was announced at the meeting that benefits would not be withdrawn immediately, that the men would be given a brief time in which to secure employment. In the meantime, union headquarters in the coke region are being kept open while union property, such as tents and housing equipment, is being reassembled. It was stated that the miners would not be ejected immediately from the tents or barracks under union ownership or control.

No matter what may be said, the fact is that the U. M. W. A. has deserted the miners in the coke region, something not entirely new to the U. M. W. A. when it is recalled that the strike in a part of the West Virginia fields was abandoned after the strikers had been through civil warfare.

The strike was lost in the coke region eight weeks after it had started. At that time the pendulum started its backward swing and not long afterwards the operators had reorganized their plants and were operating with imported labor; augmented in some instances by miners who saw that the strike was a lost cause and returned to their jobs. So far as production is concerned, the strike has not existed in the coke region for months. Transportation facilities are such that the operators cannot give steady employment now to the workers already on their payroll.

There is no blacklist in the region. But the 3000 men who are thus abandoned by the union must take their places as entirely new employees and take their turn when vacancies at the plants exist. It is unlikely that any great number of them will have an opportunity to return to work before late spring, unless the transportation problem is sufficiently solved to permit full operation of the mines and coke plants.

With two exceptions, every local in Fayette county was represented at the New Salem convention on Thursday by two delegates. Four Greene county locals were represented. No Westmoreland county locals were represented. The utmost secrecy was maintained regarding the meeting and no delegates were admitted to the meeting until after the closest scrutiny of their credentials. On one occasion, it was reported that an unauthorized delegate was in the building. The hall was cleared and the credentials again examined before proceeding.

Newspapermen were not permitted even within earshot of the building. One newspaperman was given a chase when he attempted to get inside the "deadline." A considerable number of men stood outside during the entire proceedings.

End of Union Efforts

The action of the union is expected to end all efforts to unionize the Connellsville coke region. Union representatives talk of "another day," but the workers in the region apparently have learned their lessons, judging from the bitterness and resentment manifested on the part of the victims. There have been more strikers in Uniontown during the last two days than for many months. Crowds of strikers recall the early days of the trouble when the streets were filled with strikers.

Operators in the region ceased long ago to consider the strike issue as any factor in the situation with the possible exception of what effect it might have on April 1 in the event of a strike in the union fields. With indications that there will be no strike in the union fields, even this phase is not given serious consideration. With the abandonment of the men in the coke region, all possibilities of any serious disturbances in the region have passed and the outlook is for as steady and consistent production in the region as transportation facilities will permit.

Poor Car Supply

Car placements during the past week have not exceeded an average of 10 per cent. Failure to get cars back from consignees, embargoes in the East and Northeast and various other reasons are assigned by the railroad companies for the deplorable lack of cars, even more serious than during the transportation chaos of the winter of 1917-18.

The coal operators are facing the most serious situation. Coke car placements are being made at an average of between 80 and 90 per cent and in many instances during the past fortnight coal cars have been placed for coke loading. Railroads showing this preference are said to take the position that the need for coke is more urgent just now than the need for bituminous coal, an argument that doesn't meet with very great favor on the part of the coal operators.

Coke quotations are around $8. Coal quotations are ranging around $3.

A report in the *Journée Industrielle* states that disagreement has arisen among the directors of the Société Française des Aciéries Basset, which has resulted in the resignation of four members of the Board representing the Ougrée-Marihaye Co. In view of the fact that this large Belgian company did much to promote interest in the Basset process for producing steel direct from ores, the resignation of its representatives is the cause of much discussion. From statements made by the Ougrée-Marihaye Co., it would appear that its assistance was given in a technical capacity, and that it is in disagreement with the Basset company's methods of publicity. It would also appear that the Belgian company is not yet fully convinced of the efficiency of the process. The Basset works at Dennemont are stated to be producing 1000 tons of steel per month, and the construction of a works at Mortain will shortly be begun.

TERMS EXPLAINED

How Union of Brier Hill and Youngstown Sheet & Tube Companies Will Be Carried Out

James B. Kennedy, chairman board of directors Brier Hill Steel Co., Youngstown, has issued a letter to stockholders explaining terms of the sale of the company's properties and assets to the Youngstown Sheet & Tube Co. In part the letter reads:

The agreement of sale between the Brier Hill Steel Co. and the Youngstown Sheet & Tube Co., among other things, provides for the purchase of all our assets by the purchaser, upon the following terms:

(a) Our preferred stockholder can have his preferred stock redeemed at $105 and accrued dividends per share, in cash, or if later such preferred stockholder in our company and the purchaser are both willing, he can exchange a share of his Brier Hill preferred stock for a share of the preferred stock of the Youngstown Sheet & Tube Co. In case such exchange is made, the preferred stock of the Youngstown Sheet & Tube Co. must be delivered for his account previous to March 15, 1923 and the stock so delivered for his account will be entitled to dividends declared and payable after the date of delivery.

(b) Our common stockholder will receive for his common stock one share of the Youngstown Sheet & Tube Co. no par common stock, present authorized issue, in exchange for four shares of the no par common stock of the Brier Hill Steel Co., and in case of fractional shares, the exchange will be made on a cash basis of $76 per share for the Youngstown Sheet & Tube Co. no par common stock, and the common stock of the purchaser is to be delivered for the account of our stockholder previous to March 15, 1923, and to participate in dividends thereafter declared on the common stock of the Youngstown Sheet & Tube Co.

The Brier Hill company's corporate identity is to be dissolved, and the properties will be operated as the Brier Hill Works of the Youngstown Sheet & Tube Co. There will be no delay in taking over the plants, following formal ratification of the sale by shareholders, states an official of the Sheet & Tube company.

President of George W. Armstrong & Co. Declared Bankrupt

DALLAS, TEXAS, Jan. 23.—George Washington Armstrong, head of George W. Armstrong & Co., Fort Worth, manufacturers of merchant iron bars, concrete bars and oil mill supplies, filed a voluntary petition in bankruptcy in Federal Court Friday, listing his liabilities as $1,130,005.38 and assets as $2,514,872.64. Of the total assets, the sum of $2,000,000 is listed as "a claim against the Federal Reserve system for alleged damages." "I think the above claim is a just one and should be prosecuted by the trustees," Mr. Armstrong said in his petition. In the petition 8889 shares of stock in the steel company are listed. The petition was allowed and Glenn Smith was named by Federal Judge J. C. Wilson as referee.

A few months ago, the Armstrong company attracted considerable attention by the medium of page newspaper advertising which announced a thorough reorganization of the firm and that it would deal more extensively in steel products.

New Installations of Electric Heat-Treating and Brass Melting Furnaces

The Electric Furnace Co., Alliance, Ohio, has sold to the Columbia Tool Steel Co., Chicago Heights, two 100-kw. tool steel annealing furnaces. These furnaces are especially adapted to handle long bars of tool steel in boxes, with the temperature under automatic control. The furnaces are of the car type. Another installation is for the Auto Strop Safety Razor Co., New York, which consists of two furnaces adapted for heating lead baths through which razor blade steel is drawn for treatment. The first bath will be maintained at 1500 deg. Fahr. and the second bath at about 600 deg. Fahr. These furnaces are under automatic control.

Hadfields, Ltd., Sheffield, England, is installing a 360-kw. car type electric furnace for the heat treatment of manganese steel castings. This furnace is a duplicate of one installed some time ago for the American Manganese Steel Co., Chicago Heights, and is similar, excepting in size, to the one just starting in the plant of the Lorain Steel Co., Johnstown, Pa, for similar work.

Besides the above listed heat-treating furnaces there have been installations for the Buick Motor Co., Flint, Mich., of a third furnace for melting brass; for the Ohio Injector Co., Wadsworth, Ohio, of a 105-kw. brass melting furnace; a 75-kw. furnace for melting brass for the Hammond Brass Works, Hammond, Ind.; a 75-kw. brass melting furnace for the American Stove Co., Bedford, Ohio. and another furnace with special automatic control has just been shipped to its Cleveland plant for the calorizing of stove chimneys.

President Campbell Makes Statement to Employees

In an official statement to employees of the Youngstown Sheet & Tube Co., Youngstown, President James A. Campbell says:

"The officials of this company recently reached an agreement with the officials of the Brier Hill Steel Co., whereby this company proposes to acquire by purchase all of the plants and assets of that company. Later another and separate agreement was reached with the officials of the Steel & Tube Co. of America for the purchase of its assets.

"When the stockholders of our company and those of the two companies we expect to acquire have given their consent, the details of these transactions can be quickly worked out. Until necessary arrangements are completed, we will be unable to give you any information as to our plans for the future; but we believe that these acquisitions will place this company in a stronger competitive position, geographically and otherwise, than at present, as well as that the properties can be operated more economically under one organization than separately, and thus be able to serve the public better than at present.

"If this proves to be true, the arrangement will be beneficial to all concerned, the public, the stockholders and the employees of all companies interested."

It is reported that James H. Grose, who has been president of the Brier Hill company, will be appointed operating head of the Sheet & Tube properties in the Chicago district. Prior to becoming the Brier Hill president, he was general superintendent of the Carnegie Steel Co. properties in the Youngstown district.

Scrap Rates Increased

WASHINGTON, Jan. 23.—In a decision made public yesterday the Interstate Commerce Commission found justified tariffs proposing to increase from $1.64 to $1.89 the commodity rate on scrap iron and steel between Metropolis and Cairo, Ill., on the one hand and St. Louis on the other hand from St. Louis to Brookport and Thebes, Ill. The rates, which have been under suspension, will become effective on Feb. 2.

A conference to consider the advisability and feasibility of formulating a national safety code on walkway surfaces has been called by the American Engineering Standards Committee, to be held at the Engineering Societies Building, New York, Feb. 14, at 9.30 a. m. Forty trade associations, technical societies, safety organizations and Government departments have been invited to send representatives.

A course in the technique of export trade, calculated to give the students a knowledge of documents actually used in putting through an export order, has been announced by the Wall Street division, 90 Trinity Place, New York, of New York University. The term will open Feb. 5.

EXPORT BUSINESS IMPROVES

Japanese Merchant Buying Continues on a Small Scale—Large Construction Projects in Foreign Markets

NEW YORK, Jan. 23.—Export business begins to show some improvement not only in merchant inquiries and light purchasing from Japan, but also in inquiry from China and South American markets. As yet this activity is confined to small merchant inquiries, but many exporters to markets where European competition has been particularly keen believe that the present situation in Europe, which will undoubtedly contribute to still further delays in delivery, will bring out some business. One export house dealing with Chinese markets reports, in addition to a number of small inquiries for material generally carried in stock, an order for about 800 tons of second-hand plates and 165 tons of wire shorts. This company has booked about $150,000 worth of business, in small lots, of wire, nails, sheets and pipe for stock in Manila, P. I. Some business originally placed in Germany by buyers in South America is reported to have been recently canceled and the orders placed with American interests. Australia is stated to be particularly active at present.

From Japan there are, at present, a large number of inquiries for sulphate of ammonia, which during the past week have developed in a number of cases into orders. Merchant inquiry continues and one Japanese house reports an order for 1350 boxes of tin plate for stock while another exporter to Japan reports the sale of 1000 boxes of tin plate. The ship material inquiry reported last week as in the market from the Mitsubishi Shoji Kaisha, is for the construction of two ferry-boats for a Japanese railroad interest. The recent tender of Yokohama municipality for 13½ track miles of girder type rails for the Yokohama Electric Railway Co., was awarded to Suzuki & Co. and placed with the leading interest. The tender specified 9 miles of 72-lb. T rails, 2 miles of 91-lb. T rails and 2½ miles of 102-lb. grooved rails.

Pig Iron Importation

Importation of foreign iron continues on a small scale. The price of Scotch iron is strong and one importer states that about the best quotation he can make now on Scotch foundry No. 3 is $29 to $30 per ton, c.i.f. Atlantic port. This price is too high to permit of competition with the domestic product except in shipments to foundries in the New England district near Boston, which are reported as purchasers of small tonnages from time to time.

Proceeds of a 40,000,000 milreis ($4,476,000) bond issue by the Brazilian Government will be used for the purchase of locomotives, box cars, rails and other railroad equipment, as well as the completion of certain improvements and repairs, according to reports received by the Bureau of Foreign and Domestic Commerce.

It is also reported that extensive improvements to a large sugar plantation in the Lourenco Marques district of Portuguese East Africa, are contemplated. About £3,000,000 will probably be expended largely for irrigation work and sugar-mill construction.

The Argentine Government is considering a proposal for the expenditure of about 4,500,000 paper pesos ($1,665,000) for construction of bridges, highways, schools, repair work, drilling equipment and the building of waterworks.

The Bureau of Foreign and Domestic Commerce also notes the projected construction by the National Sanitary Works of Uruguay of an electric light and power plant in Concepcion del Uruguay to cost about 4,787,959 paper pesos ($4,068,765).

Republic Iron & Steel Co.'s Earnings

On account of absent directors and consequently no quorum for the February meeting, the board of directors of the Republic Iron & Steel Co., at a meeting held Jan. 17, decided to resume dividend payments on the preferred stock, and declared the regular quarterly dividend of 1¾ per cent, payable April 2, to stockholders of record March 15.

As a preliminary statement of earnings, it was announced by John A. Topping, chairman of the board of directors, that net profits for the quarter ending Dec. 31, 1922, were about double dividend requirements on the preferred stock, and that the outlook for business and earnings was encouraging.

Electric Steel & Forge Co., Cleveland, Acquired

The plant of the Electric Steel & Forge Co., Cleveland, has been acquired by interests that formerly controlled the Atlas Crucible Steel Co., Dunkirk, N. Y., and the name has been changed to the Hunter Crucible Steel Co. Arthur H. Hunter, formerly president of the Atlas company has been elected president and general manager of the Hunter company. F. D. Lounsberry, formerly assistant to the vice-president and metallurgist of the Atlas company, is first vice-president and works manager; L. H. Vinnedge, formerly one of the sales managers for the Atlas company, is secretary and A. B. Smythe is treasurer. W. D. Wells formerly vice-president and manager of the Electric Steel & Forge Co. is second vice-president and assistant treasurer of the new company and Fred Beebe is assistant secretary. It is announced that practically the entire former operating organization of the Atlas company will be transferred to the Cleveland plant. The new company will manufacture a complete line of tool and alloy steels. It is now placing its plant in operation and expects to have all departments in full operation by March 1.

The company formerly known as the Crucible Steel Forge Co. was absorbed by the Electric Steel & Forge Co. in 1918 A new plant was built, being completed in 1920. The plant is equipped with a 6-ton and a ½-ton electric melting furnace, a 500-ton forging press, several steam hammers and 16-in. and 10-in. mills.

The Atlas Crucible Steel Co. was recently merged with the Electric Alloy Steel Co., Youngstown.

Wages in New York State Factories

Reports of the New York Industrial Commissioner show that the average factory wage in the State in October was $25.61 per week compared with $25.71 in September. These two are the highest figures since the middle of 1921, but are considerably below the figures prevailing two years ago when a maximum was reached in October of $28.93 per week and when the figure exceeded $28 for each of the last eight months of the year (1920).

Frank D. Johnson, for a number of years associated with the Brown Hoisting Machinery Co., Cleveland, and for the past three years in charge of that company's branch sales offices, and G. H. Bales, formerly connected with the Goodyear Tire & Rubber Co., have organized the J. & B. Mechanical Supply Co., with offices at 226 Superior Avenue, Northwest, Cleveland. They will act as sales agents for forgings made by the American Forge & Machinery Co., Canton, Ohio, transmission equipment and reducing gears, made by the W. A. Jones Foundry & Machine Co., Chicago, belting made by the Detroit Oak Belting Co., Detroit, and forgings made by the A. W. Cadman Mfg. Co., Pittsburgh.

Priority of an invention covering the use of alternating currents for arc welding in connection with a transformer, affirmed on Oct. 5, 1922, in favor of Claude J. Holslag, of the Electric Arc Cutting & Welding Co., Newark, N. J., has been reaffirmed on Jan. 12, 1923, by examiners in chief of the U. S. Patent Office.

EASIER FREIGHT CAR CONDITIONS

Demand for Freight Cars Slightly Decreased—Extremely Heavy Traffic

WASHINGTON, Jan. 23.—The demand for freight cars is now less than it has been at any time since the middle of September, according to reports filed last Thursday by the carriers with the Car Service Division of the American Railway Association. On Jan. 7 requisitions for freight cars in excess of the current supply totaled 73,285 cars, a decrease of 9642 within a week. At the same time 20,426 surplus freight cars, in good repair and immediately available for use if traffic conditions warranted, were reported scattered throughout the country. This was an increase within the same period of 5445.

The shortage in box cars on Jan. 7 amounted to 30,895 which was a decrease since Jan. 1 of 7502. The shortage in coal cars totaled 34,243 which was a decrease within the same period of 2282. The increase in the number of surplus freight cars is due to a falling off in the demand for virtually all classes of equipment. A total of 6691 surplus box cars in good condition was reported on Jan. 7 which was an increase since Jan. 1 of 1629, while 5490 surplus coal cars in good condition were reported, an increase within the same duration of time of 1839.

Freight cars in need of repair on Jan. 1 amounted to 216,011 or 9.5 per cent of the cars on line. This was an increase of 2174 over the number in need of repair on Dec. 15 last. Reports showed that while there was an increase during the last half of December in the number of freight cars in need of light repairs, there was a marked reduction in the number in need of heavy repair during the same period. For instance, on Jan. 1, 164,041 cars were in need of heavy repair, a decrease of 5229 compared with the number on Dec. 15. Cars in need of light repairs at the beginning of the year totaled 51,970 cars, a gain within a little over two weeks of 7403 cars.

Freight traffic in November on the railroads of the country was the heaviest for that month in history, according to reports just made by the carriers to the Bureau of Railway Economics.

Measured in net ton miles—that is, the number of tons of freight multiplied by the distance carried—the railroads transported in November 38,046,185,000 net ton miles. This was an increase of slightly more than 30 per cent over the same month in 1921, and an increase of 2 per cent over the same month in 1920.

For the first 11 months in 1922, freight traffic amounted to 339,338,283,000 net ton miles, which was an increase over the corresponding period in 1921 of 6.4 per cent, but a decrease under 1920 of 18 per cent. This decrease compared with 1920 was almost entirely due to a falling off in coal shipments because of the five months miners' strike.

Meeting of Drop Forging Association

The annual meeting of the American Drop Forging Institute was held at the Engineers' Club, New York, on Tuesday, Jan. 9. The report by the retiring president showed a successful year for the organization, including an increase in membership of nearly 100 per cent in spite of the business depression, which has generally curtailed organization memberships.

The following officers were elected for the coming year:

President, R. T. Herdegen, president and general manager Dominion Forge & Stamping Co., Walkerville, Ont.

First vice-president, H. G. Stoddard, vice-president and treasurer Wyman-Gordon Co., Worcester, Mass.

Second vice-president, O. F. Transue, president and general manager Transue & Williams Steel Forging Corporation, Alliance, Ohio.

The constitution of the organization does not permit re-election of officers or directors, and consequently the three retiring members of the board, C. E. Adams, president Cleveland Hardware Co., Cleveland; C. A. Brauchler, president and general manager Canton Drop Forging & Mfg. Co., Canton, Ohio, and F. C. Billings, president Billings & Spencer Co., Hartford, Conn., were succeeded by Maurice E. Pollak, vice-president Pollak Steel Co., Cincinnati; W. H. Becks, vice-president and general manager Henry & Allen, Auburn, N. Y., and S. J. Marshall, president and treasurer Endicott Forging & Mfg. Co., Endicott, N. Y.

Scovell, Wellington & Co., Hanna Building, Cleveland, will continue as commissioners of the organization. The organization has under way a campaign of cost accounting education under the leadership of the cost committee. This committee consists of J. B. Sehl, second vice-president Billings & Spencer Co., Hartford, who is chairman; C. C. Winn, Wyman-Gordon Co., Worcester, and F. S. Hatch, Moore Drop Forging Co., Springfield, Mass.

Hearing on Immigration Bill

WASHINGTON, Jan. 23.—The Senate Committee on Immigration tomorrow will hold a hearing on a bill introduced by Senator Reed of Pennsylvania which increases the quota of alien immigrants admissible to the United States from 3 to 5 per cent and which changes the present basic year on which immigration is fixed from 1910 to 1890. The effect of the proposal would be to increase quotas from North Europe and to decrease those from a number of Southern European countries. Among the witnesses will be Senator Reed and the Commissioner of Immigration.

A bill which incorporates recommendations of the National Association of Manufacturers for liberalizing the present restrictions on immigration, has been prepared by Senator Colt of Rhode Island and a hearing will be held on it in the near future. As has been pointed out by THE IRON AGE this bill maintains the present percentage but provides that in determining the quotas, consideration shall be given to the number of immigrants of a particular nationality who may have left the United States. Provision is also made to authorize the Secretary of Labor to admit immigrants in excess of quotas when the fact is established that there is a shortage of a particular kind of labor.

Mechanical Engineers to Meet at Montreal

The spring meeting of the American Society of Mechanical Engineers will be held in Montreal, Que., May 28 to 31. It will be preceded by a trip which will start at Buffalo on May 26 and visits will be made to points of interest to engineers en route to Montreal. Following the meeting there will be excursions to Quebec and points north and east of Montreal.

A Pacific Coast regional meeting of the society will be held in Los Angeles beginning April 16 and extending through three days. One of the features of the meeting will be an extended visit to the astronomical observatory located at Mt. Wilson.

Among engineering meetings scheduled for the next few weeks may be mentioned the following:

Chicago, Jan. 29, at the Western Society of Engineers. The Mechanical Engineer as a Citizen, by Charles Piez, president Link Belt Co., Chicago.

Cleveland, Jan. 30, at the Winton Hotel. The Blast Furnace, by B. D. Quarrie, general manager Otis Steel Co., Cleveland. E. E. Blundell, Cleveland Automatic Machine Co., 2269 Ashland Road, Cleveland, is secretary.

Schenectady, N. Y., Feb. 23, at Edison Hall. Recent Improvement in Steam Locomotive Design, with slides and moving pictures, by Mr. Ashworth of the American Locomotive Co. R. O. Ackerman, General Electric Co., Schenectady, N. Y., is secretary.

Orders for Electric Hoists

The Electric Hoist Manufacturers' Association reports that its members have received during December, 1922, orders for 336 hoists valued at $180,729, and have made shipments of hoists during this same period valued at $157,283.

CONTENTS

January 25, 1923

Gray Iron Castings from Electric Furnace 269

Possibility of Commercial Production—Acid and Basic Practice Compared—Rôle of Heat Treatment

Cuba's Duty-Free Manganese Ore Supply 275

Deposits Estimated at 700,000 Tons, Important to United States in Case of War, But Costs High and Operations Limited.

Alloy Steels for Structural Purposes 281

Nickel, Nickel-Chrome and Silicon Steel in Bridges—Possibilities of Copper as an Alloy—Use of Heat-Treated Steel

Poor Prospects of Upper Silesian Industry 287

Unfavorable Conditions for Iron and Steel Making—Economic Consequences of Partition of Country Between Poland and Germany

Rotor Design the Feature of New Motor.. 274
Moving Pictures Show Making of Cast Iron Pipe by DeLavaud Process..... 274
Ten Years of Prices of Basic Pig Iron, Heavy Melting Steel and Machinery Cast Delivered Eastern Pennsylvania.. 277
Bethlehem Plans 278
Detroit Foundrymen's Meeting..... 278
Production Drilling Machine..... 279
New Hexagon Turret Lathe..... 280
Simplifying Metal Containers..... 280
Coal and Labor Problems..... 282
December Employment Statistics..... 282
Miller with High Speed Attachment..... 283
Reclaiming Light Scrap Iron and Steel... 283
Line of Standard Die Sets..... 283
Women in Steel Mills..... 284
Molders Demand Advance..... 284
Eight-Hour Day in Belgium..... 284
Export Managers to Meet..... 284
Labor and Wage Notes.....284, 289, 290, 291
Cleveland Engineering Society Meets..... 284
Coming Meetings 284
Trophy for Safety Work..... 285
Columbia Steel Corporation to Expand... 285
Cable Armored by Heavy Wire..... 286
Report of Bureau of Yards and Docks... 286
Portland Cement Production..... 288
Merger Details of Youngstown and Brier Hill Companies 290
New Installations of Electric Heat-Treating and Brass Melting Furnaces..... 290
Scrap Rates Increased..... 290
Export Business Improved..... 291
Easier Freight Car Conditions..... 292
Meeting of Drop Forging Association.... 292
Hearing on Immigration Bill..... 292
Mechanical Engineers to Meet..... 292
Editorials 294
The Occupation of the Ruhr—The Rise of Pressed Steel—Increasing Supplies of Scrap — Investigating Foreign Credits—Iron and Labor for Warships —Alloy Steels for Bridges—Upward Trend in British Steel
Correspondence 297
How Can This Casting Be Chilled?—Sheet Annealing Furnaces Using Powdered Coal
Record Year in Automobile Output..... 297
Trade Conditions in Canada..... 298
Pulverized Coal in Belgian Steel Plant... 298
British Steel Exports in December..... 298
German Market Depressed..... 299
Fabricated Steel Business..... 314
Railroad Equipment Buying..... 314
Status of Brier Hill Employees..... 315
British Iron and Steel Market..... 318
German Steel Prices Higher..... 318
Book Reviews and Books Received..... 319
Spiral Riveted Pressure Pipe..... 319
Iron and Industrial Stocks..... 331

Iron and Steel Markets 300
Comparison of Prices 301
Prices Finished Iron and Steel, f. o. b. Pittsburgh.....313
Non-Ferrous Metal Market.....315
Personal Notes 316
Obituary Notes 317
Machinery Markets and News of the Works.....322
Prices of Raw Materials, Semi-Finished and Finished Products....331
New York Jobbers' Prices.....332

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

The Occupation of the Ruhr

Every business man knows how difficult it is to conduct a great enterprise, or even one of moderate size, so as to insure success. This is true even when conditions are favorable in the relations of employers and employees, and statistics show that a considerable percentage of business men have failed at least once. If employers and employees hate each other, disaster will almost certainly come to both. This is the condition today in the wonderful valley of the Ruhr, which is rich in coal and in industries built upon its coal, but holds tremendous possibilities of financial loss for all the world.

If any further evidence were needed of the difficulties involved in the carrying on of industrial operations among hostile peoples, it is furnished by the account elsewhere in this issue, of conditions in Upper Silesia, where the iron and steel industry has an extremely gloomy prospect as one of the economic consequences of the partition of the country between Poland and Germany. But this evidence is not needed, for the reports coming by cable daily show the almost insurmountable obstacles to the restoration of peace and prosperity in the Ruhr.

The ultimate result of the French occupation of the German territory is a matter of the liveliest speculation, but one on which prediction is extremely hazardous. A noteworthy development is the interest shown in the situation by iron and steel manufacturers of England. Sir William Larke, director of the National Federation of Iron and Steel Manufacturers, London, is quoted in a cablegram to the New York *World* as saying that "a combination of German interests in the Ruhr with the French interests in Lorraine would be a reversion to pre-war conditions when both these interests were controlled by Germany." He doubts whether even political and national feeling will be strong enough to prevent this combination and says that the British iron and steel industry will be much concerned as to such a movement and will watch it closely with a view to protecting its place in world markets by any suitable measures which opportunity and conditions may dictate.

If any such union should be formed, it would be far in the future, for it would be necessary to go far on the road of conciliation to bring the French and Germans into harmonious working relations.

Some temporary benefit may come to the United States as a result of the conditions in France and Germany, but this country can only feel deep regret that some better method of compelling Germany to meet its obligations was not found. The allies of France in the war have not now and never have had any thought but that Germany must make reparation to France to the full extent of her ability. But whatever the devious turns Germany has made in her efforts to escape restitution, on the practical question of the best means to enforce her claims France might well have taken the counsel of her strongest friends.

The present state of war in the Ruhr may yield France some return, great or small, in coal, in gold marks, or other material forms. But it is bound to be costly in intensified hatreds and in prostration of industry. The predictions made by thoughtful men at the beginning of the late war, that ultimately all the world would suffer from it, if not in it, have been fulfilled to a greater degree than many believed likely then. Today there is no disguising the possible consequences of the happenings in the Ruhr, both to peace and to industry—consequences that will be world-wide and that the United States had a vital concern in averting.

The Rise of Pressed Steel

The census figures for 1921 show that the total value of machine tools manufactured in that year was $67,769,161. This is less than a third of the total of $212,400,158 for the previous census year, 1919. As prices were lower in 1921 than in 1919, the showing as to the number of machines manufactured was, of course, not quite so bad.

One class of machinery, presses, actually made a gain in 1921 over 1919. The value of presses manufactured in the earlier year was $6,356,800, and in 1921 $8,927,410. Such an increase, in the face of poor business in almost all other lines, is strong evidence of the growing popularity of the pressed or stamping method of making parts and

one explanation of the increasing vogue of strip steel as brought out in THE IRON AGE'S article of Jan. 4, "Where the Steel Went in Nineteen Twenty-Two."

A given industry often appears to develop at the expense of another. But usually the one invaded finds other ways of utilizing its materials, methods or equipment and actually also shows expansion, though possibly for the time being not at the rate for industry in general. This principle of gain out of seeming loss is commonly lost sight of. It was not understood when actual war was waged against electricity by illuminating gas interests, nor has it ever been by wage earners when labor-saving contrivances have been introduced. In the long run things turn out for the common good, even though there be intervals of purse pinching.

Increasing Supplies of Scrap

Supplies of scrap for the steel trade since the Armistice have been much heavier than before the war. Recognizing that the termination of hostilities converted into scrap a great deal of steel previously valuable, the disposition has been to attribute the largeness of the scrap supply entirely to that prominent fact. There are, however, other influences that will be felt in future. It may be assumed that by far the greater part of the scrap left over from the war has now been consumed.

It has been an interesting subject for guessing, what is the "average" length of service for steel before it comes back to the industry for reworking, through the blast furnace, the open-hearth furnace or the rolling mill. The common guesses have been 15 or 20 years. It may not be possible now to improve on the guesses, but it can be seen that whatever the period used to be the average has tended to decrease.

It is probably a safe generalization that machinery as a whole costs less in proportion to the value of service it performs than it used to cost, while at the same time manufacturers are more ready to scrap machinery. The current improvements may appear smaller than those that were being made 15 or 20 years ago, but competition is closer, so that it requires less to make an old machine unprofitable.

Oil production is more mobile than formerly. There are wells in Pennsylvania that have been pumping for decades, but this is not characteristic of the newer fields. In building construction generally it is a question, perhaps, whether we are building more or less for permanence than formerly, but a smaller proportion of the total steel produced is going into permanent construction than was the case 15 to 25 years ago.

While the individual lines of steel consumption cannot be considered or measured by the same system, only general trends being observable, the case of railroad steel consumption is relatively clear. There was a time when railroad buying of steel was chiefly for building railroads, and thus the steel taken was promised a long life. Now the steel purchased is rather for upkeep. There is more traffic on the rails, and they wear out faster, per ton of rail in employment. The heavy building of steel freight cars from, say, 1899 to 1907, or about 20 years ago, was largely for the replacement of wooden cars, the wrecking of which brought out relatively little scrap by comparison with the fresh consumption of steel. It was some time before it could be realized that steel freight cars do wear out, but that fact is now accepted. The current repairs, furthermore, produce a very considerable tonnage of scrap. Altogether, the railroads are returning in scrap a larger percentage of the new steel they buy than formerly. That pulls down the "average," whatever it may be, of the time in which steel in general stays in employment before reworking.

Then there is the automobile, which has taken from 5 to 10 per cent of the steel, and is commonly regarded as having a life of six years. Certainly that shortens the general average.

Finally, there is the mathematical factor, that production of steel is growing less rapidly than it used to grow, whereas the increasing scrap return is in relation rather to the rate at which steel production used to increase, and thus the scrap makes a larger proportion to the current production of steel.

Prior to 1911 we made more pig iron than steel ingots and castings. Last year the production of pig iron was less than 80 per cent of the production of ingots and castings, the production of steel-making pig alone being in the neighborhood of 60 per cent of the steel total. Works scrap constitutes a large part of the difference, but the proportion of commercial scrap is growing.

Investigating Foreign Credits

Hundreds of doubtful, in many cases uncollectable, claims against customers in foreign countries are held by American exporters, accumulated since the war. Most of them come in the preventable class, according to a report of the Division of Commercial Laws of the Department of Commerce. Valuable lessons have been learned. One result is a tightening of credit favors. The exporter has discovered the expensiveness of granting credit without due discrimination. "There is more of a disposition to look up the standing of the applicant for credit," says the report, "to exchange ledger experience with other exporters, to provide safeguards against credit abuse or unforeseen events. Thus the insurance of export credits against the insolvency of debtors or against the uncollectability of approved accounts has grown to an appreciable degree during the past year, while the ledger experience interchange effort initiated some time ago by the credit men's organization has established definitely its usefulness in dollars and cents."

With the multiplication of dependable means of obtaining credit information, including the Department of Commerce itself, it seems astonishing that better use has not been made of it. It is easily understood that there is a temptation to save the cost of a financial report on a shipment of less than $500, but it is also "an undeniable fact that the unscrupulous buyer, knowing the

psychology of the average credit man, restricts his purchase to items of this magnitude exclusively." He knows that if he places an order for $5000 the credit man will go to some trouble to look into his rating, but if he orders $400 worth of merchandise the risk of shipping the goods may be taken.

The argument is well made that the cost of credit information on a small order of goods should not be charged to that order alone, but to the account of which it may be the beginning. Ordinarily a $500 export order is little more than a sample. A foreign trade confined to such shipments would seldom reach prosperous proportions. But in the first contact with a customer abroad proper investigation may prove profitable not only as a safeguard, but, on occasion, in giving complete data as to a live and enterprising firm, whose orders may grow into high multiples of $500.

Iron and Labor for Warships

The importance the British iron and steel industry attaches to the construction of the two new battleships just laid down under the arrangement covered by the Conference on the Limitation of Armaments appears from several recent statements. One is that the construction of the ships will involve a total of 1,000,000 tons of iron ore, and it has been proposed that the Admiralty stipulate that British ore alone be used. The use of native material is expected to provide employment for the whole of the West Cumberland iron ore miners.

Another point brought out prominently is the very great stimulus to steel mill and shipbuilding and allied labor over a period of perhaps three years. The total cost of the two ships, it is estimated, will be about £12,500,000. Of this amount, approximately £10,000,000 will go directly to labor and employment will be given, all in all, to something like 25,000 men.

These facts explain the great disappointment in British iron and steel and shipbuilding circles when it was found necessary to cancel the contracts already placed for four ships of much larger individual size than these two. In place of 190,000 tons displacement of new ships, there will be only 70,000 tons, with corresponding reduction in the demand upon British labor and British materials.

In contrast with the revival in the American steel industry in 1922 and the lesser one in Great Britain, Canada continued seriously depressed. The output of both steel and pig iron was the smallest in 17 years—485,000 tons of steel and 383,000 tons of pig iron. The 20 blast furnaces in Canada have an annual capacity about four times their output of 1922. Fuel difficulties and meager railroad buying accounted in part for the depression in the metal-working industries, but in no small part also there was the effect of the demoralization in Europe. Developments since the opening of the new year are more reassuring. Rail orders amounting to 65,000 tons have been placed with the Algoma and Dominion mills, and the two locomotive works will soon be busy on new orders. Canada has usually responded to any business revival in the United States, sometimes following by a few months, but in the present instance the unfavorable factors have caused a much longer postponement. There are now indications that 1923 will be a far better year for the metal-working industries than Canada has seen since the activities of 1919 and 1920.

Alloy Steels for Bridges

New information on the extent to which alloy steels figure in steel structures is given on another page. The author shows that in bridges such steels are being more generally considered by engineers, and that they are no small factor in present-day construction.

In this presentation two important developments stand out—the use of so-called silicon steel and the possibilities of copper as an alloy. Silicon steel has entered into the construction of a number of bridges and is to be an important factor in the new Delaware River bridge at Philadelphia. As pointed out by the author, however, it properly should be called a silicon-manganese steel, as the amount of the latter element, approaching 1 per cent, doubtless contributes much to the superior physical properties. There is a close parallel to the 1.25 to 1.50 per cent manganese steel which, particularly as castings, has an important place in industry. The author's statements concerning copper as an alloy open up large possibilities and dispose of some prejudices. That certain combinations of copper result in a steel equal to nickel steel is of no small industrial importance, and the statement will cause some surprise.

This latter claim raises the question whether such a steel would not possess rust-resisting properties and do away with the necessity of frequent coatings of paint. In that case the day of its considerable use in large structures is not far distant.

Upward Trend in British Steel

Three facts stand out in the record of the iron and steel industry of Great Britain in 1922 which give a measure of the recovery which has been and is still in progress there. Production of both pig iron and steel gained momentum as the year progressed, so that the average for November and December represented high point for two years. For the year the production of pig iron was 4,899,500 tons, and that of steel (including castings) 5,831,900 tons, compared with 2,616,300 tons and 3,703,400 tons respectively in 1921 and 10,260,300 tons and 7,663,800 tons in 1913.

The surprising feature of the year was the increase in exports. These reached an average of about 350,000 tons per month in the last quarter, or 100,000 tons more than for the first quarter. The noteworthy fact is that this movement at the close of the year was about 85 per cent of the pre-war or 1913 average, which was 414,000 tons per month. The third index of the year's status is the value of shares of iron and steel companies.

For 38 companies this value stood at 105.6 as the index number on Dec. 14, 1922, or the highest point since December, 1920, contrasting with the low point of 79.0 on Feb. 14, 1922. This improvement has been shared by most of the companies whose stocks are officially quoted.

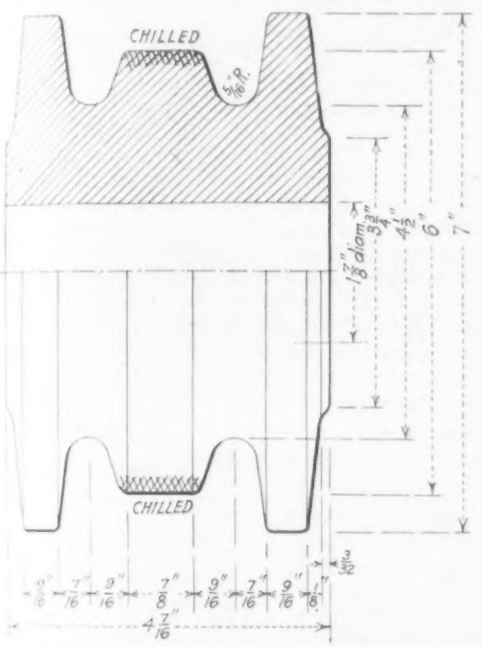
Although British steel prices now stand at less than 25 per cent above pre-war prices, representing severe sacrifices in many quarters, railroad freight rates still range from 60 to 200 per cent above the pre-war basis for the raw materials used in the industry. According to the London *Iron and Coal Trades Review*, the majority of the heavy steel products are being made at a loss. But leaders in the industry look for a solution of this transportation problem and to a still greater improvement in steel output in 1923. While the British revival is due largely to export demand, that in the United States is based entirely on domestic consumption.

CORRESPONDENCE

How Can This Casting Be Chilled?

To the Editor: It is desired to have the wiring surface of the small double flanged truck wheel, shown in the illustration, chilled.

The castings are wanted in several sizes from 7 to 12 in. in diameter, and as the production is limited to orders of 50 to 100 at a time, the equipment should not



be too elaborate, and at the same time it would not be satisfactory to regard the job as an ordinary jobbing proposition. It is to be noted that it is necessary to bore out the center to 1⅞ in. in diameter.

We would like to know a practical method of chilling this particular surface and have the finished surface round. It seems necessary to make the chill in segments, but these joints will ordinarily leave a bump, which is not permissible.

There would be no objections to chilling any other part of the casting, if this would help.

A. E. HAGEBOECK,
Manager, Moline Plant
Frank Foundries Corporation

Moline, Ill., Jan. 17

Sheet Annealing Furnaces Using Powdered Coal

To the Editor: In the introductory paragraph of the article describing the continuous annealing furaces of the Ashtabula Steel Co., in THE IRON AGE of Nov. 23, page 1342, it is stated that this is the first installation of continuous furnaces for box annealing using pulverized coal as fuel. If this refers to this country we have no comment to make, but it will no doubt interest many of your readers to know that about three years ago our colleagues, Societe Anonyme des Appareils de Manutention et Fours Stein of Paris built for Forges de Basse Indre, Acieries de St. Nicholas de Revin (France) a furnace of this identical type.

This furnace is 50 m. long, 1.2 m. wide; production, 60 metric tons per day; fuel consumption per ton of steel, 10 per cent; that is, 100 kg. (220 lb. per ton of 2200 lb.), representing a saving of 30 per cent over furnaces with grates for burning coal.

A similar furnace was built about the same time for Societe des Laminoirs de la Rochette (Belgium). This furnace is 12 m. long and 2.05 m. wide; production, 30 metric tons; fuel consumption, 11 per cent, i. e., 110 kg.

Since the statement in your columns is contrary to fact and to claims we are making to the trade, will you not be good enough to make a suitable statement correcting this unintentional error? F. W. IREDELL.

Mt. Vernon, Ohio. Chapman-Stein Furnace Co.

Record Year in Automobile Output

In spite of a slight decline in December from the average figures of several preceding months, the output of automobiles, as reported by the Census Bureau, totaled 206,418 passenger cars and 20,138 trucks, making the production of the last half year 1,297,674 passenger cars and 128,563 trucks. Both figures are well in advance of those for the first half year, which were 1,036,497 passenger cars and 114,486 trucks. In the last half of 1921 the output was 789,414 passenger cars and 68,624 trucks. Under both headings, the output of the last quarter was more than double the fourth quarter's output of 1921, the figures for passenger cars being 637,149 against 311,466 and for trucks, 63,231 against 31,130.

Production for the year amounted to 2,334,171 passenger cars and 243,049 trucks, or a total of 2,577,220 altogether. This is about 65 per cent ahead of the 1921 output and about 15 per cent more than the production of 1920, which showed the highest previous record.

Scrap Higher in the Valleys

YOUNGSTOWN, Jan. 23.—Heavy melting scrap has advanced to $23 on firm sales in this territory. A number of melting interests have made purchases at this figure. Compressed sheets are firm at $21, with some dealers quoting $21.50.

The prospects for 1923 were briefly discussed in an issue of the Brooklyn *Daily Eagle* by H. H. Doehler, president Doehler Die Casting Co., Brooklyn. "A manufacturer," he said, "who will arrange his plans and budget on the basis of 1922 volume, who will practice economy, avoid waste, increase efficiency and who will furnish quality and service, is bound to have a successful and prosperous year."

At the annual meeting of the American Plan Association of Cleveland, held Jan. 18, directors were elected as follows: C. C. Robbins, Cleveland Crane & Engineering Co.; S. D. Wright, Atlas Car & Mfg. Co.; F. G. Hodell, Chain Products Co.; George W. Booker, F. B. Stearns Co.; and W. B. Greene, Acme-Palmers & DeMooy Foundry Co.

IMPROVED PROSPECTS

More Favorable Conditions in Canada—Important Railroad Buying

TORONTO, Jan. 20.—While the month of January has not been a really outstanding one in so far as actual trade is concerned, it has been the opening chapter in what is expected to be one of the best years in Canada's history with regard to Canadian industrial expansion. Early in the month prospective business began to make its appearance in greater volume than has been the case for some time, and while some of this business has been closed, the great bulk has still to be placed. Iron and steel interests of the Dominion are not only looking forward to an active demand for the commodities they produce, but these concerns are actually preparing to meet a greatly increased demand. During the past couple of weeks, the Canadian National Railways is reported to have placed some large contracts for rolling stock, including locomotives, freight cars, refrigerator cars, as well as for steel rails totaling some 65,000 tons, the latter order being split between the Algoma Steel Corporation, Sault Ste Marie, Ontario, and the Dominion Steel Corporation, Sydney, N. S. The former will roll 40,000 tons of this order. Locomotive orders placed include one to the Kingston Locomotive Co., Kingston, Ontario, 26; and the Montreal Locomotive Works, Montreal, Quebec, has an order for 35 locomotives.

In addition to the big demand which is expected to develop for iron and steel commodities in the Dominion during the present year, producers of these materials are also looking forward to a large export demand, and with this end in view steel interests are seizing every opportunity to secure a firm footing in European countries, South America, British dominions and other large importing countries of the world. During the year 1922, the British Empire Steel Corporation shipped from its Wabana, Newfoundland, mines some three-quarter million tons of iron ore, for use in European steel mills, the bulk of which was purchased for consumption in Germany, and it is expected that the tonnage of ore shipped from Newfoundland will reach a much greater total during the present year.

General manufacturing conditions are having a stimulating effect on the demand for iron and steel bars. Local mill representatives report good business in these lines, and the new orders being received, together with orders carried over from last year, are of sufficient volume to keep mills busy on these commodities for upward of three months. Bars are quoted at 2.60c., Toronto. Building activities are showing steady improvement and as a result a brisk demand continues for structural shapes, beams and reinforcing bars. Extensive construction work on the Welland Canal, as well as on new building account, will have the effect of strengthening the demand for reinforcing bars. Structural shapes and beams are quoted at 2.40c., Toronto.

Pulverized Coal in Belgian Steel Plant

An Esslingen boiler of the multi-tubular type, at the Ougree plant of the Societe Anonyme Ougree Marihaye, Liege, Belgium, which is equipped for powdered coal firing with the Quigley system, was recently given a 24-hr. test. The boiler has a heating surface of 2422 sq. ft. and a superheating surface of 936 sq. ft. The steam pressure gage was 137 lb. and the draft in front of damper, 0.12 in. of water. The proximate analysis of pulverized coal showed:

	Per Cent
Fixed carbon	52
Volatile matter	27
Ash	15½
Moisture	1

This coal had a fineness, through 100 mesh, of 92½ per cent and measured 12,744 B.t.u per pound. The feed water temperature was 52 deg. Fahr., average.

Evaporation of 8927 lb. of water per hour figured out at 3.77 lb. per sq. ft. of heating surface.

The average analysis of flue gas showed CO_2, 15 per cent; O, 3 per cent; CO, 0 per cent. The temperature of gas at outlet of boiler was 293 deg. Fahr.; temperature in combustion chamber, 2642 deg. Fahr.; temperature of superheated steam, 473 deg. Fahr.

On Billet and Ingot Heating Furnaces

Two bar mill reheating furnaces in this plant, heating steel billets for rolling into sheets, light rails and margin bars, were formerly hand fired with a good grade of coal and consumed 73 kg. (161 lb.) of coal to heat each ton of billets. They have now been changed to pulverized coal firing, and the fuel consumption per ton of billets heated, is reported to have been reduced to 35 kg. (77 lb.), or a saving of 84 lb. of coal per ton of billets, which means over 12 tons of coal per day.

In the large rail mill are also two furnaces, heating ingots of various sizes, which have been changed similarly from hand firing to pulverized fuel firing, with the result that, where formerly these furnaces consumed 48 kg. (106 lb.) of coal per ton of ingots heated, they now consume only 15 kg. (33 lb.) per ton. The ingots are charged hot, at an average temperature ranging from 750 to 1100 deg. Fahr., and discharged from the furnace at a temperature of 2280 deg. Fahr. The fuel saving here is more than 15 tons per day.

British Steel Exports in December

WASHINGTON, Jan. 23.—British iron and steel exports in December totaled 340,823 gross tons, a decline of 31,509 tons as compared with November, while imports totaled 114,011 tons, an increase of 34,204 tons, according to a report received by the Department of Commerce from Commercial Attaché Walter S. Tower, London. At the end of December there were in operation 169 blast furnaces, seven being lighted during the month, and 243 open hearth furnaces, 37 of the latter being lighted. November and December import and export figures follow in gross tons:

	Imports		Exports	
	Nov. 1922	Dec. 1922	Nov. 1922	Dec. 1922
Pig iron and ferroalloys	12,762	20,596	117,708	87,122
Tin plate	....	....	37,307	43,023
Galvanized sheets	....	....	40,204	47,906
Plates and sheets	3,913	6,695	34,537	31,276
Steel bars, rods, angles, etc.	7,962	8,436	20,470	28,769
Railroad mat'ls except rails	914	1,346	15,981	11,474
Rails	370	352	21,968	24,190
Cast tubes, pipes and fittings	1,567	1,921	9,363	8,238
Wire	2,522	3,320	7,736	7,063
Wrought tubes, pipes and fittings	853	1,493	12,015	10,715
Structural steel	3,923	5,718	8,714	6,370
Hoops and strips	2,096	759	5,897	5,354
Iron bars, rods, angles, etc.	5,351	12,756	3,379	2,755
Bolts and nuts inc'd screws for metals	427	445	1,486	1,520
Wire mfrs'	554	341	1,987	2,084
Ingots, blooms, billets, slabs, etc.	28,679	42,004	1,453	2,070
Nails, tacks, rivets and washers	279	121	1,304	1,047
Wire cables and ropes	....	....	1,838	1,531
Wire nails inc'g staples	5,239	5,309	290	174
Iron and steel castings in the rough	409	351	77	47
Iron and steel forgings in the rough	83	158	74	38
Total	79,807	114,011	372,332	340,823

Canadian Pig Iron Advances

TORONTO, Jan. 23.—Following the slump that hit pig iron prices during the first week of December last, a much stronger basis is now making its appearance and prices have been steadily advanced from $30.80 for No. 1, Toronto, until local blast furnace representatives are now quoting this grade of iron at $33.55. The drop in price, however, had one effect on the market; it gave melters an opportunity to buy iron for first quarter at a low figure, which the large majority took advantage of, and at the present time Ontario melters are pretty well covered for this period, although there is still a certain amount of spot iron in demand. One feature of the past few weeks is that agricultural implement manufacturers have entered the market for iron for first quarter, and it is expected

that these concerns will shortly improve the scope of their operations.

While there has been no general increase in the number of furnaces operating, it is stated that the Algoma Steel Corporation, Sault Ste. Marie, Ontario, will blow in additional furnaces before March 1, when it will start rolling on its new rail contract. The Algoma Steel Corporation has one furnace operating at present on foundry. The Steel Co. of Canada, Hamilton, Ontario, has one stack in operation and expects to blow in a second in the near future. The Dominion Steel Corporation, Sydney, N. S., has two furnaces in blast at present.

Pig iron prices are firm and further advances are expected in some quarters. Present prices are as follows: No. 1 (2.25 to 2.75 silicon), $33.55; Malleable, $33.55; No. 2 foundry (1.75 to 2.25 silicon), $32.55; Toronto. Montreal prices are: No. 1 and malleable, $35.90; No. 2, $34.90; Summerlee and Carron, $33 to $35 per ton.

GERMAN MARKET DEPRESSED

Prior to Ruhr Occupation Unemployment Was Increasing and Business Light, But Back Orders Filled Works

BERLIN, GERMANY, Jan. 7.—Noticeable, but not serious depression, has overtaken all branches of industry. The home buying craze has for the time being ceased. Unemployment is increasing. In August the number of unemployed receiving public support was slightly more than 11,000; by Dec. 1 unemployment had increased to 42,593; and the January figures are expected to show a further rise. The proportion of unemployed among labor union members has risen in the same time from 6 to 20 per thousand. The latter percentage is, however, less than half the average in the winter months of pre-war years; and the absolute number of unemployed is only one quarter of the number at the end of 1921. With exception of the textile industry production is still active. As the shortage of labor in the metal branches in 1922 (estimated at 50,000 workers) was greater than the number of unemployed, unemployment theoretically did not exist. There is today a strong agitation, backed even by leading Socialists, for longer working hours. The Labor Unions Association reports that the average working day is much shorter than the legal maximum eight hours. Of 1,389,413 employees among whom a census was made, only 601,594 worked 48 hr. a week, more than 500,000 worked less than 46 hr., and over 200,000 worked as little as 42 hr.

Iron and Steel Prices

Iron and steel prices show a tendency to fluctuate. During the mark-exchange recovery of last month, there were slight reductions; but pig iron was again increased on Jan. 1; and if the mark again falls new price-rises are inevitable. Railroad freight rates are still moving upward and on Dec. 1 averaged 1685 fold the pre-war level. Ruhr coal is now 36,810 m. per metric ton, compared with 600 m. a year ago; and English coal, which is being imported in larger quantities, increased during the year from 1,054 m. to 45,225 m. per metric ton c.i.f. Hamburg, or 56,442 m. c.i.f. the iron and steel centers. Although the commodities price-rise in December was relatively slight, the prices of many classes of semi-finished and finished goods have increased to within sight of world-market prices.

As manufacturers lately began to complain that they could not export, the Government abolished the 30 to 60 per cent supplements to export duties imposed on Aug. 30, when the disparity between German and foreign prices was very great. The shortage of working capital is still great but it chiefly affects the smaller iron, steel and machinery producers. The larger concerns have such resources and such wide ramifications that they are faced with no serious difficulties. Capital raised by all corporations in 1922 totaled 80,613,000,000 m. against 31,855,000,000 m. in 1921; but the 1921 capital represented a very much reduced buying-power. The capitalization of all German share corporations, which was 14,000,000,000 gold marks in 1914, is today 97,000,000,000 paper marks; so that, assuming a mark depreciation to 1/2000th, the gold capital of all all corporations has shrunk to about 1/300th.

Ruhr Coal Production

The steel industry is still badly hampered by coal shortage. Ruhr coal production in 1922 was 97,450,000 metric tons, against 94,100,000 tons in 1921, 70,950,000 tons (the lowest point) in 1919, and 114,540,000 tons in 1913. Before last December there was a marked recovery, the Ruhr daily production rising from 298,036 tons in June, 1922, to 354,483 tons in November, and falling to 340,000 tons in December. A new setback is threatened through the repudiation by the Socialist labor unions of their recent agreement for working extra shifts. Brown-coal production increased in 1922, but figures are not yet available. In 1913, 87,116,000 metric tons were produced in the present German area and in 1921 122,942,000 tons. In the last recorded months of 1922, the brown-coal output increased.

Exports and Imports

The demand for heavy iron and steel products is still active; and, owing to the permanent shortage of production, this activity will continue even if general trade depression ensues. The October trade reports, the last published, show the insufficiency of domestic production. There were 40,769 tons of pig iron imported against 24,494 tons exported; 58,819 tons of scrap imported against 12,554 tons exported; and 42,020 tons of ingots, blooms, slabs, etc., against 12,484 tons exported. The Prussian Trade Ministry's monthly report for Jan. 1 states that native trading firms prefer to buy foreign heavy iron and steel because of the shorter foreign delivery term.

The demand for rolling mill products is still great. Of the finishing metal industries only the locomotive branch is in an unsatisfactory state. The locomotive works company of Cassel, one of the largest, has begun to discharge workmen. Orders for locomotives have been received from the Portuguese state railroads; but Poland is reported to have given most of her orders to the United States and Belgium. The market for small iron and steel articles is still fairly active; but the electrical branch complains that owing to capital shortage it has suspended plans for new buildings and extensions and in the cable branch orders are falling off.

On export to Russia great hopes are placed. The new Wolff organization has opened a branch in Petrograd and agents of the Stinnes Electro-Metal combination are again at Moscow. Reports from the Finnish Minister at Moscow, from Herr Zieten, agent of a Westphalian group, and from other quarters agree that production in Russia is beginning to revive; and that the new official methods make possible independent activity whether by native Russians or foreigners. The Moscow Finance Commissariat has sanctioned a scheme for expenditure of 5,000,000 gold rubles on import of farm machinery; and a further sum of 72,800,000 gold rubles has been allotted for purchase from abroad of electrical plants. The number of German agents in Russia is rapidly increasing. Their reports agree that Russian production must be revived on the spot before any recovery of foreign trade can take place.

The Mannesmann Tube Co. has completed its consolidation with the Bergwerks Gesellschaft consolidation. Mannesmann has declared a 50 per cent dividend. The Eisenwerk Kraft has consolidated with the Stumm concern. The Upper-Silesian Bismarckhuette Corporation has announced a dividend of 50 per cent. The total German iron and steel production is still unknown, no figures having been issued since October, 1919; but it seems that there has been a large increase in open-hearth steel production during the past year. Of the leading corporations only the Rhenish steel works publishes its production figures; and these show that pig-iron production in 1922 exceeded that of 1921 by 117,500 tons, but was 71,227 tons behind that of the last pre-war year. The steel production exceeded that of 1921 by 134,683 tons, and was only 4161 tons behind pre-war.

Iron and Steel Markets

MILLS FARTHER BEHIND

Unusually Heavy Tonnage in Building and Tank Work

Soft Coal Settlement Points to Easier Coke Prices —Further Advances in Steel

Steel producers, particularly in the Pittsburgh district, find it difficult to get operations up to the scale called for by their order books. Their less receptive attitude toward new business comes from the feeling that as spring approaches the labor situation will be worse.

While the well-booked condition of the mills signifies also that many buyers are covered for the first quarter, the upward tendency of prices is accountable for some of the current inquiry. There are cases in which builders are hurrying plans for new work so as to place the steel at prices recently quoted.

At the same time there is still sharp competition for pending structural jobs, and in spite of advances asked by steel companies, fabricators' bids show that plain material has been figured well below 2c., Pittsburgh.

The news of agreement between the soft coal operators and the union miners has been anticipated for several weeks in the calculations of blast furnace and steel companies. The calling off at the same time of the long ineffective strike at non-union Connellsville mines makes little change in that situation. Assured continuance of coal production means that with the passing of winter coke will decline along with coal. That fact and its effect on the pig iron market are being carefully weighed both by producers and consumers.

Railroad embargoes and congestion, particularly in New England are still a serious problem. At Philadelphia the continued rise in scrap and its scarcity have made a difficult situation for some steel works. Heavy melting steel scrap has advanced $6 in as many weeks. Efforts to buy such scrap in England have come to nothing.

The statement commonly current in the past ten days that 2c. has disappeared as an actual basis of transactions in plates, shapes and bars must still be qualified, but the exceptions are rarer and are rather in bars and shapes than in plates. Here and there a bar mill that did not sell freely when the market was lower has capacity open for 2c. business at 60 to 90 days' delivery.

The market in other finished products follows that in the three major forms. Eastern makers have advanced bar iron $3 a ton to 2.15c., Pittsburgh. In iron pipe advances were made on Jan. 22 of $8 to $20 a ton. There are indications of higher sheet prices for the second quarter. In wire, while the Steel Corporation has not put its base prices to the independent level, it is asking higher extras on annealed and galvanized wire. Spikes and track bolts are higher by $3 a ton and tie plates by $2.

The week's business in fabricated steel was phenomenal, amounting to 93,500 tons for 45 jobs, and being at a rate over four times that of the first two weeks of January. Oil tank work accounts for 35,000 tons, a Detroit power house for 8000 tons, a Chicago hotel for 10,000 tons, two office buildings in that city for 8400 tons and McKinney Steel Co. blast furnace improvements for 4500 tons. In new work 14 more projects have appeared, calling for 22,000 tons.

The Rock Island, Virginian, Illinois Central and the Chicago & Northwestern roads have bought locomotives, accounting for 140 of the week's total of 173. Chicago mills have protections out on 31,000 cars, representing 300,000 tons of plates, shapes and bars.

Among agricultural works some of those manufacturing tillage tools are operating at 80 to 90 per cent of capacity. In harvesting machinery, which will move later, there is an increase but not so great.

Manufacturers of automobile parts have been recent buyers of bars and there has been a good demand for special sections for automobile rims. The call for sheets has been heavy, particularly from the automobile trade, and mills are about filled up for the first quarter.

Buying of pig iron is of moderate volume and prices are firm, but show little change. Alabama iron seems to be fairly well established at $24, Birmingham. Silveries have advanced $1.

Anxiety of consumers of coal in both Great Britain and Germany in regard to obtaining supplies, owing to conditions in the Ruhr Valley, is shown in efforts to sound the market as to importing coal from the United States. A quotation has been made on a cargo of coal for shipment to Germany, but it is doubted if the purchase will be made. Several British agents are actively negotiating.

Continental markets have been thrown into such confusion by the Ruhr occupation that mills are declining to quote on finished steel, particularly merchant bars, plates and beams. On semi-finished steel there has been no market price for weeks.

Pittsburgh

Mills Conservative as to New Business — Wrought Iron Pipe Advanced

PITTSBURGH, Jan. 23.—While new demands for steel are somewhat smaller than they were earlier in the month, they still are fairly numerous and reach a rather sizable aggregate in relation to open capacity. The mills are very heavily committed on practically all products and consequently are not very anxious for additional obligations. It is difficult to get plant operations up to the point warranted by order books on account of the shortage of labor, and there is a pretty general fear that with the approach of spring the labor situation will get worse. The possibility is reflected in the attitude of the mills toward new business. It is a sellers' market.

In the past week, 2c. has practically disappeared as a price on steel bars while at least one maker of cold-finished steel bars has gone to 2.75c. base, as against 2.50c. base, still quoted by most producers. Advances of from $8 to $20 per ton have been made

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 23, 1923	Jan. 18, 1923	Dec. 19, 1923	Jan. 24, 1922
No. 2X, Philadelphia‡	$29.76	$29.76	$28.76	$21.34
No. 2 Valley furnace†	27.00	27.00	25.00	19.00
No. 2 Southern, Cin'ti†	**28.05**	27.05	27.05	20.50
No. 2 Birmingham, Ala.†	**24.00**	23.00	23.00	16.00
No. 2 foundry, Chicago*	29.00	29.00	28.00	19.00
Basic del'd, eastern Pa.	**28.50**	28.00	27.50	20.25
Basic, Valley furnace	26.00	26.00	24.25	18.00
Valley Bessemer, del. P'gh	29.27	29.27	29.27	21.46
Malleable, Chicago*	29.00	29.00	28.00	19.00
Malleable, Valley	27.00	27.00	26.00	19.50
Gray forge, Pittsburgh	28.27	28.27	26.27	20.96
L. S. charcoal, Chicago	33.15	33.15	33.15	30.50
Ferromanganese, furnace	107.50	107.50	100.00	60.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	37.50	37.50	36.50	28.00
O.-h. billets, Pittsburgh	37.50	37.50	36.50	28.00
O.-h. sheet bars, P'gh	37.50	37.50	36.50	29.00
Forging billets, base, P'gh	43.00	43.00	41.50	32.00
O.-h. billets, Phila	**45.17**	43.67	43.17	33.74
Wire rods, Pittsburgh	47.50	47.50	45.00	36.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.50
Light rails at mill	2.15	2.15	2.10	1.50
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	**2.475**	2.325	2.275	1.81
Iron bars, Chicago	2.35	2.35	2.35	1.60
Steel bars, Pittsburgh	**2.10**	2.00	2.00	1.50
Steel bars, Chicago	2.10	2.10	2.10	1.60
Steel bars, New York	2.34	2.34	2.34	1.83
Tank plates, Pittsburgh	2.10	2.10	1.95	1.50
Tank plates, Chicago	2.30	2.30	2.30	1.60
Tank plates, New York	2.44	2.44	2.29	1.83
Beams, Pittsburgh	2.10	2.10	2.00	1.50
Beams, Chicago	2.20	2.20	2.20	1.60
Beams, New York	2.44	2.44	2.34	1.83
Steel hoops, Pittsburgh	2.75	2.75	2.75	1.90

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Jan. 23, 1923	Jan. 18, 1923	Dec. 19, 1923	Jan. 24, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.35	3.00
Sheets, galv., No. 28, P'gh	4.35	4.35	4.35	4.00
Sheets, blue an'l'd, 9 & 10	2.50	2.50	2.50	2.25
Wire nails, Pittsburgh	2.70	2.70	2.70	2.50
Plain wire, Pittsburgh	2.45	2.45	2.45	2.25
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.15
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$4.75
Old Material, Per Gross Ton:				
Carwheels, Chicago	$27.00	$27.00	$24.00	$15.00
Carwheels, Philadelphia	**23.50**	23.00	20.00	16.50
Heavy steel scrap, P'gh	22.00	22.00	20.00	14.00
Heavy steel scrap, Phila	**21.00**	20.00	16.50	11.50
Heavy steel scrap, Ch'go	19.25	19.25	17.50	11.50
No. 1 cast, Pittsburgh	**24.00**	23.00	22.50	16.50
No. 1 cast, Philadelphia	**24.00**	23.00	20.00	16.50
No. 1 cast, Ch'go (net ton)	21.50	21.50	20.00	13.00
No. 1 RR. wrot., Phila	23.00	23.00	19.00	14.50
No. 1 RR. wrot., Ch'go (net)	18.00	18.00	15.25	10.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$8.00	$8.00	$7.00	$2.75
Foundry coke, prompt	8.50	8.50	8.00	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.87½	14.87½	14.50	13.75
Electrolytic copper, refinery	14.50	14.50	14.37½	13.50
Zinc, St. Louis	*6.75*	6.87½	7.00	4.65
Zinc, New York	*7.10*	7.22½	7.35	5.00
Lead, St. Louis	**8.00**	7.75	6.87½	4.40
Lead, New York	**8.25**	7.95	7.25	4.70
Tin (Straits), New York	**40.00**	38.75	38.12½	31.25
Antimony (Asiatic), N. Y.	**6.85**	6.75	6.30	4.45

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Jan. 23, 1923, Finished Steel, 2.489c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Jan. 16, 1923,	2.474c.
Dec. 26, 1922,	2.439c.
Jan. 24, 1922,	2.062c.
10-year pre-war average,	1.689c.

Composite Price, Jan. 23, 1923, Pig Iron, $26.79 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Jan. 16, 1923,	$26.63
Dec. 26, 1922,	25.79
Jan. 24, 1922,	18.39
10-year pre-war average,	15.72

by leading makers of wrought iron pipe, effective Jan. 22, and there is a pretty common belief that steel pipe prices will go higher before long. Indications point to higher second quarter prices on sheets by independent manufacturers and one small maker of tin plate is reported to have advanced prices $5 per ton. Although the American Steel & Wire Co. has not changed base prices, its adoption of a new list of extras brings its price on annealed and galvanized wire to higher levels than recently prevailed. The market is firmer on hot-rolled flats, notably on narrow light material, but substantial concessions have been made on bolts, nuts and rivets to secure orders.

It is now pretty generally accepted that there will be no strike of the coal miners this year, and the fact that union organizers have officially called off the strike in the Connellsville district probably means that there will be no trouble in that district. However, Connellsville operators do not accept the announcement of the organizers at its face value and are taking such steps as they believe are necessary to obviate a repetition of last year's experiences. Absence of coal mine troubles this year means, of course, that with the passing of winter, present prices cannot hold and coke is due to decline with coal. Merchant producers of pig iron are anticipating considerably lower fuel costs for second quarter, but such a development is of rather doubtful value to them since it might well be followed by demands for lower pig iron prices. The extent of the recession in fuel prices will depend upon whether general business continues as good as it is at present.

Very little activity is observed in pig iron in this market and prices seem to have gone as high as they will go for the present. Melters seemingly are having no trouble whatever in covering their requirements. The scrap market here is strong, but the demand remains light and prices do not respond strongly to the activity and strength of outside and competing markets.

There has been no special change in steel plant operations in the last week.

Pig Iron.—It has been another quiet week in this market, and prices show no change from those of the past few weeks. The largest transaction which has come to light here involves 5000 tons of foundry iron for a radiator company with plants in Johnstown, Pa., and Trenton, N. J. This business went to the Midvale Steel & Ordnance Co., which will furnish 3000 tons from its Johnstown furnaces and the remainder from Coatesville. The price on this business; which included No. 2 and No. 2X iron, is understood to have averaged slightly above $27, Johnstown. We note a sale of 1000 tons of basic iron at $25.50, Johnstown, but the price of $26,

Valley furnace, for this grade has been fully established in the past week by a sale of 2000 tons at that figure. Outside of these transactions, business has been generally of small lots, the demand coming from the smaller foundries which, in December, did not cover their first quarter requirements, preferring to take their chances on the spot market. As high as $28, furnace, for No. 2 foundry has been done on these small lots, but some business also has been lost at that figure, and there is little question that round lots can be placed at $27, either Valley or western Pennsylvania furnaces. Large users of foundry iron are covered by contract and while they are not showing much interest in further supplies, it is noted that they are seeking larger quotas for shipment this month than are due them, and it is probable that the contracts will run out earlier than expected. A fair amount of business is reported in low phosphorus iron at from $35 to $36, Valley furnace, for copper free. The higher price, of course, applies to small lots.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	$26.00
Bessemer	27.50
Gray forge	$26.50 to 27.50
No. 2 foundry	27.00 to 28.00
No. 3 foundry	26.50 to 27.50
Malleable	27.00 to 28.00
Low phosphorus, copper free	35.00 to 36.00

Ferroalloys.—Jackson, Ohio, makers of silveries and Bessemer ferrosilicon, effective Jan. 19, advanced prices $1 a ton. Prices of ferroalloys otherwise are unchanged with business quiet, due to the fact that consumers in this and nearby districts are well covered against their requirements for the next few months and even longer on 50 per cent ferrosilicon. We note a few sales of spiegeleisen at prices ranging from $33 to $36, furnace, for 20 per cent material, the higher figure being for single carloads.

We quote 80 per cent ferromanganese at $100 furnace, $107.30 seaboard, or $112.29 delivered Pittsburgh district for domestic or British, and 76 to 80 per cent German at $67 c.i.f. Atlantic seaboard. Average 20 per cent spiegeleisen, $33 to $36, furnace; 16 to 19 per cent, $32 to $35; 50 per cent ferrosilicon domestic, $82.50 to $85, delivered. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $45.50; 11 per cent, $48.80; 12 per cent, $52.10; 13 per cent, $56.10; 14 per cent, $61.10; silvery iron, 6 per cent, $34; 7 per cent, $35; 8 per cent, $36.50; 9 per cent, $38.50; 10 per cent, $40.50; 11 per cent, $43.80; 12 per cent, $47.10. The present freight rate from Jackson and New Straitsville into the Pittsburgh district is $3.66 per gross ton.

Billets, Sheet Bars and Slabs.—Inquiry is good, but actual business is very limited because makers have so little tonnage to sell for shipment over the present quarter and are not anxious to add to their obligations, since labor already is scarce and is expected to become more so toward the end of the quarter. Quotations are purely nominal in the absence of important transactions.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $37.50 to $38.50; 2 x 2-in. billets, $37.50 to $39.50; Bessemer sheet bars, $37.50 to $38.50; open-hearths, sheet bars, $37.50 to $38.50; slabs, $37.50 to $38.50; forging billets, ordinary carbons, $43 to $47.50, all f.o.b. Pittsburgh or Youngstown mills.

Wire Rods.—Railroad embargoes in the East are holding up shipments in that direction, particularly to New England, and this creates some surplus tonnage. Users in other parts of the country, however, appear willing to take greater tonnages than are due them and there are inquiries from other sources sufficient to take up supplies which are becoming available. As much as $50 still is quoted for the base size of soft rods, but sales at above $47.50 are exceptional.

We quote No. 5 common basic or Bessemer rods, $47.50 to $50; chain rods, $47.50 to $50; rivet bolts and other rods of that character, $47.50 to $50; screw stock rods, $52.50 to $55 per gross ton f.o.b. Pittsburgh or Youngtown. Carbon rods command $3 per ton over base for 0.20 to 0.40 carbon; $5 over base for 0.41 to 0.55 carbon; $7.50 over base for 0.56 to 0.75 carbon, and $10 over base for over 0.75 carbon; acid rods, $15 over base.

Plates.—The market on this product is extremely firm with all makers at 2.10c. base, Pittsburgh, and some disposition to seek more against undesirable orders. Large users of plates are believed to be pretty well covered by contracts, but there is still a lively inquiry from the smaller companies which are getting the overflow business in railroad cars and tanks that the larger units cannot accept. Prices are given on page 313.

Structural Material.—While a good many protections still are outstanding at 2c., the general quotation of all mills here now is 2.10c. on all new inquiries. Structural shops here report a lively inquiry, but not much actual business in this immediate territory. It is said that competition for structural jobs still is pretty sharp, and that in spite of the recent advances in steel prices bids reflect that plain material has been figured at much less than 2c. Prices are given on page 313.

Iron and Steel Bars.—Prices of less than 2.10c. base on steel bars have practically disappeared since a week ago, as the Steel Corporation now is asking 2.10c. base, and that is also the quotation of the Jones & Laughlin Steel Corporation. Other independent makers who did not withdraw from the market went to 2.10c. more than a week ago, and are talking even higher prices on inquiries that are undesirable, either from a rolling or a delivery standpoint. Local makers of iron bars have advanced prices $3 per ton since a week ago, now quoting 2.75c.

We quote steel bars rolled from billets at 2.10c.; reinforcing bars, rolled from billets, 2.10c. base; rail steel reinforcing bars, 2c.; refined iron bars, 2.75c. in carloads, f.o.b. mill, Pittsburgh.

Wire Products.—Prices have been revised slightly as a result of the formulation by the American Steel & Wire Co. of a new card of extras on plain and galvanized wire as well as its adoption of the extra recently announced by independents of 15c. per 100 lb. for annealing wire. The American Steel & Wire Co. has made no change in base prices, but its extra of 15c. for annealing wire brings its price to $2.60 per 100 lb. and the extra for galvanizing wire brings the price to $3.05 per 100 lb. There is no change in galvanized barbed wire and discounts on woven wire fence also are undisturbed. Makers generally are heavily committed and are receiving heavy specifications on orders; consequently, they are not particularly anxious for new business, although some are taking nails in mixed carloads where fence is part of the order. The extras on plain wire and galvanized wire adopted by the American Steel & Wire Co. are as follows:

Extras per 100-lb for plain (bright) wire		Extras per 100-lb. for galvanized wire; add to price of plain (bright) wire
Coarser than ¼-in.	$0.10	
No. 5 gage to ¼-in.	0.05	No. 8 gage and coarser	$0.75
No. 6 to No. 9 gage	base	No. 9 gage	0.60
No. 10 gage	$0.05	No. 10 gage	0.60
No. 11 gage	0.10	No. 11 gage	0.60
No. 12 and 12½ gage	0.15	No. 12 gage	0.65
No. 13 gage	0.25	No. 13 gage	0.65
No. 14 gage	0.35	No. 14 gage	0.75
No. 15 gage	0.45	No. 15 gage	0.90
No. 16 gage	0.60	No. 16 gage	0.90
No. 17 gage	0.75	No. 17 gage	1.00
No. 18 gage	1.50	No. 18 gage	1.00

Annealing fence wire, 15c. per 100-lb. over basis of plain wire

Prices are given on page 313.

Steel Rails.—Light new steel rails hold steady at 2.15c., base, although demand lately has been moderate. Producers are catching up with old obligations and users are not as badly pressed for supplies as they were recently. Railroads tributary to Pittsburgh are reported to be specifying steadily against orders for standard rails placed last fall.

We quote 25 to 45-lb. sections, rolled from new steel, 2.15c. base; rolled from old rails, 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Rivets.—Regular quotations lately have not been particularly well observed and on large and desirable orders concessions of as much as $4 a ton have been made. It is believed, however, that those who went the lowest now are well provided with orders and with steel prices moving upward, a firmer market in rivets is expected. Prices and discounts are given on page 313.

Hot-Rolled Flats.—A single base on products under this heading is no longer possible, because of an increasing tendency to make prices fit costs. On hoops of like gage and less than 1 in. in width, the labor costs run high and 2.90c. base is minimum, while some mills are getting as high as 3.25c., base. Hot-rolled strips

ready for use are no longer easily placed at less than 2.90c., but on hoops and bands of the easily rolled gages and widths the market is still 2.75c. base. Prices are given on page 313.

Bolts and Nuts.—Large and attractive orders still are eagerly sought by manufacturers and we note sales at as low as 60 and 10 per cent off list on large machine bolts, against the quoted discount of 50 and 10 per cent off list. The explanation is found in the fact that there was a considerable slowing up in demand following brisk ordering over the end of 1922 and the first week of the new year, and several makers found themselves not very well booked. Prices for the last quarter of 1922 seem to have overdiscounted the advance in raw materials and that also has told on the market. Quoted discounts are given on page 313.

Cold-Rolled Strips.—Specifications against contracts are coming along in good volume and makers have found no necessity for shading quotations to secure them. The market may be described as firm at 4.50c. base. Prices on second quarter contracts are expected to be announced shortly.

Steel Skelp.—The market shows no change except that producers are pretty heavily booked and it is not easy for those seeking tonnages for early delivery to place them. Steel pipe skelp of the ordinary gages and widths still is quoted at 2c. for either grooved or sheared, but on boiler tube skelp, which is narrow and light, the market is quotable at 2.40c. to 2.50c., based on sales.

Sheets.—Signs still point to higher prices by independent makers on second quarter tonnages, as these interests are showing a marked disinclination to consider business for delivery after April 1. All makers are well sold up for the present quarter, but with mill operations high and little interruption to shipments, except to New England, which is embargoed on account of heavy snows, users are comfortably supplied and there is not yet much paying of premiums for deliveries. Some mills are getting 2.60c., base, for blue annealed, and some are as well committed on galvanized as they want to be and are asking 4.50c., base, but on the bulk of business, particularly on black sheets, the Steel Corporation prices still prevail. Independent mills are operating at above 90 per cent of capacity and the leading interest at close to that rate. Prices are given on page 313.

Tin Plate.—Container manufacturers still are watching shipments closely and registering complaints when they are not right up to quotas. Meanwhile, specifications are coming along freely against contracts. The market is very firm, as is evident from the fact that sales of stock tin plate are reported to have been made at full quotations.

Cold-Finished Steel Bars and Shafting.—One maker here has gone to 2.75c. base and reports sales of fair size at the figure. The more common price, however, still is 2.50c., and in view of the fact that hot-rolled bars now are not easy to obtain at less than 2.10c. base, allowing a differential of only $8 per ton, it is evident that those holding at 2.50c. are giving their customers some of the benefit of their low-priced hot bar purchases. Ground shafting is unchanged at 2.90c. base, f.o.b. mill for carloads.

Iron and Steel Pipe.—Leading makers of wrought iron pipe have issued new cards, dated Jan. 22, increasing prices from $8 to $20 per ton. Discounts on standard black pipe have been cut four points on all sizes except 2-in. to 2½-in., on which the reduction is six points; standard galvanized pipe discounts have been reduced six points on all sizes except 2-in. to 2½-in., on which the discount has been lowered eight points. On extra strong grades the discounts are reduced four points on black and six points on galvanized, except on 2-in., on which the reduction is seven points on black and eight points on galvanized. On double extra strong pipe, all sizes except 1-in. in both black and galvanized prices have been advanced 10 points, 1-in. pipe holding at the old discounts. There is a good demand for wrought iron pipe and a really active market in steel pipe, makers of which are obliged to "police" their orders, since the possibility of an advance makes distributors anxious to get on to mill order books for much greater tonnages than they ordinarily take. Inquiry for oil country goods and line pipe is heavy and the promise is for a much better balance this year between orders for these lines and standard pipe than was the case in 1922. Discounts are given on page 313.

Boiler Tubes.—Demands upon the makers of steel pipe still are extremely heavy and urgent and promises of delivery on lap welded goods are becoming so deferred as to be almost indefinite. Makers of iron boiler tubes also are well sold up and as they have specifications against probable production during the present quarter they are not anxious for more business. Discounts are given on page 313.

Warehouse Business.—Effective Jan. 22, Carnegie Steel Co. and Jones & Laughlin Steel Corporation advanced warehouse prices of bars, structural shapes and bands $3 per ton. New prices are 2.85c. base for bars, 2.95c. base for structural shapes and 3.65c. base for bands. Other warehouse interests have followed. Good demand is reported for warehouse products.

Track Fastenings.—New business does not amount to much, but specifications against old orders are liberal. The Steel Corporation has gone to $49 per net ton for tie plates and this now is minimum, since independent makers are at $50 per net ton. Local makers of track bolts are quoting $3.85 base, per 100 lb., but admit having lost business at that price. Prices are given on page 313.

Coke and Coal.—Prices are holding at about the same levels as a week ago and general market conditions show little or no change. The market on furnace coke still is being made largely by demands for other than blast furnace use. Some blast furnace buying for both spot delivery and for shipment over the remainder of the present quarter is noted. However, this business has been done largely at $8 per net ton, oven, but for heating and domestic uses sales have been made as high as $8.50. Prices of foundry grade range anywhere from $8.50 to $9.50 per net ton at ovens, but there is a brokerage commission in the sales carrying prices of more than $9. The coal market is quotable from $3.25 to $3.50 per net ton at mines for mine run steam coal and from $3.75 to $4 for mine run coking and gas coal. Demand from the East for soft coal has dwindled to very limited proportions because of railroad embargoes, but this has not had much effect upon prices because car shortages have interfered considerably with production.

Old Material.—There is no special change in prices of the steel works grades, but it cannot be said that the market is any weaker since there is no pressure to sell. Pittsburgh mills remain out of the market, but this does not count against prices because of the strength and activity of outside markets, to say nothing of the fact that several dealers here are short of the market. A good sized purchase of No. 1 cast scrap at $24.50 Scottdale, Pa., has stiffened the market on that grade.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton	
Heavy melting steel	$22.00 to	$22.50
No. 1 cast, cupola size	24.00 to	24.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; and Franklin, Pa.	22.00 to	22.50
Compressed sheet steel	20.50 to	21.00
Bundled sheet sides and ends	19.00 to	19.50
Railroad knuckles and couplers	24.00 to	24.50
Railroad coil and leaf springs	24.00 to	24.50
Low phosphorus standard bloom and billet ends	25.50 to	26.00
Low phosphorus, plates and other grades	24.50 to	25.00
Railroad malleable	21.00 to	21.50
Iron car axles	29.00 to	30.00
Locomotive axles, steel	24.00 to	25.00
Steel car axles	22.50 to	23.00
Cast iron wheels	23.50 to	24.00
Rolled steel wheels	24.00 to	24.50
Machine shop turnings	17.00 to	17.25
Heavy steel axle turnings	18.50 to	19.00
Short shoveling turnings	18.50 to	19.00
Cast iron borings	19.00 to	19.50
Heavy breakable cast	20.00 to	20.50
Stove plate	17.00 to	17.50
Sheet bar crop ends	23.00 to	23.50
No. 1 railroad wrought	20.50 to	21.00

Chicago

Fear Prices Will Advance Too Quickly — Market Very Strong

CHICAGO, Jan. 23.—Steel is growing so strong that there is apprehension that prices may be moved up too rapidly. Both sellers and buyers, however, hope that further advances will be gradual, realizing that a sharp rise generally portends an equally sharp reaction. The view has been expressed that present indications seem to point to a decided scarcity of material in the near future. For a leading local mill, new business booked during the past week was the heaviest since the middle of November, 1922, while tonnage entered for rolling, which includes specifications against contracts, was the largest since February, 1921. Chicago mills are now booked tight through this quarter and in some instances considerably beyond. For early delivery users must look to outside producers whose books likewise are rapidly filling up. Even at the beginning of the year, commitments of local producers were close to 100 per cent larger than a year ago and 90 per cent of this tonnage represented live specifications. Their position in the fourth week of January is even stronger. They have protections out on 31,000 railroad cars, representing 300,000 tons of steel. Building activity continues to increase in volume. Oil storage tanks let during the week account for 35,000 tons of plates, while the six largest fabricating awards involve a total of 22,000 tons of material.

One of the most impressive features of the market is the growing diffusion of industrial activity. In 1922, railroad buying was the mainstay of Chicago mills. For one producer, in fact, the railroads directly or indirectly accounted for nearly 45 per cent of the total output of the year. Now other industries are also making heavy demands on the mills. In view of the long period of dull business, they are all anxious to participate in the prosperity which appears to be ahead and are restive because of the difficulty of obtaining full raw material needs. Whether this situation will result in the payment of high premiums for prompt material is still an open question. After what happened in 1920 and 1921, it is probable that caution will be the rule. It is also to be noted that costs still tend to prevent premium buying. While manufacturers do not lack business, they still find it difficult to earn a profit owing to rising labor and material costs. At the same time, they are slow to advance their prices, knowing how easily the ultimate consumer may be frightened out of the market. With restraint on the part of both users and producers of steel, it is hoped that the present cycle of expanding business may be prolonged over a considerable period.

There are still those who feel that the economic situation is out of balance and that the process of readjustment has not been completed, but has merely been postponed. The low purchasing power of the farmer is pointed to; yet it is a fact that the farmer has resumed buying. Manufacturers of tillage tools, which in the order of work on the farm are necessarily the first to be marketed, are operating at from 80 to 90 per cent of capacity. Other agricultural machinery makers are steadily improving their operations.

Local mill output is unchanged. The fuel situation shows no improvement and labor scarcity is a source of increasing concern.

Pig Iron.—Buying is again picking up, and while current sales are largely under 500 tons each, heavy inquiries have appeared. A Wisconsin melter is inquiring for 1000 tons each of malleable and foundry for second quarter delivery. A Chicago user wants 1500 tons of foundry, 500 tons for first quarter and the remainder for second quarter shipment. A melter in northern Illinois is in the market for 1000 tons of malleable for February, March and April delivery. A Milwaukee sanitary manufacturer is inquiring for 500 to 1000 tons of Southern foundry for shipment during the remainder of the first half. There are numerous other inquiries ranging from 100 to 500 tons. Local furnace prices are unchanged. A number of Southern furnaces are out of the market for first quarter and those still quoting are using a minimum of $24, base Birmingham. We note a sale of 200 tons for prompt shipment to a Michigan user at that price. Second quarter quotations range from $24 to $25, Birmingham. The furnace shipping by the water and rail route, however, is quoting $28, delivered Chicago, for second quarter shipment. A Milwaukee inquiry calls for 200 tons of low phosphorus for February shipment. There have been numerous scattered sales of charcoal and an early advance in prices is looked for. Silvery has advanced $1, 8 per cent now being quoted at $36.50, Jackson, or $41.29 delivered Chicago. A considerable tonnage was placed on the eve of the advance and a few small sales have been made at the new prices.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.15
Northern coke, No. 1, sil. 2.25 to 2.75	$29.00 to 30.00
Northern coke, foundry No. 2, sil. 1.75 to 2.25	29.00 to 29.50
Malleable, not over 2.25 sil	29.00 to 29.50
Basic	29.00 to 29.50
High phosphorus	29.00 to 29.50
Southern No. 2, first quarter	30.01 to 31.01
Southern No. 2, second quarter	28.01 to 31.01
Low phos., sil. 1 to 2 per cent, copper free	35.50 to 36.76
Silvery, sil. 8 per cent	41.29

Ferroalloys.—Spiegeleisen has advanced $1 to $37, furnace, or $46.05, delivered Chicago. Two sales of more than 1000 tons each and numerous smaller ones were made just prior to the advance.

We quote 80 per cent ferromanganese, $115.06, delivered; 50 per cent ferrosilicon, $85 to $87.50, delivered; spiegeleisen, 18 to 22 per cent, $46.05, delivered.

Plates.—The Sinclair interests have made additional purchases of oil storage tanks, involving 35,000 tons of plates. For the Wyoming fields tanks requiring 27,000 tons have been ordered, while for a refinery at Houston, Tex., nearly 8000 tons of work has been let. Railroad car buying continues to be the most important factor in the market. Local mills have protections out on 31,000 cars, representing 300,000 tons of plates, shapes and bars. Prices on tank plates from Chicago producers remain unchanged, but mills east of here are quoting a minimum of 2.10c., Pittsburgh. Local mills are sold tight for first quarter and new business for shipment during that period is being placed elsewhere.

The mill quotation is 2.20c. to 2.30c., Chicago. Jobbers quote 3.05c. for plates out of stock.

Cast Iron Pipe.—The market continues very active and in some sizes pipe shops are sold four and five months. Private companies as well as municipalities are buying heavily. The Detroit City Gas Co., which was in the market for 5000 tons of gas pipe, has thus far placed half that tonnage. The city of St. Paul has not yet closed for 7000 tons of 24 to 42-in. water pipe, although it has bought 2640 tons of smaller pipe as recorded last week. Dubuque and a number of other Iowa cities contemplate entering the market for more than 1000 tons each. Springfield, Ill., takes bids Jan. 22 on 120 tons of 10-in. class C and 50 tons of 6-in. Elmwood Park, Ill., will receive revised bids from contractors on 800 tons Jan. 26. Prices are strong and have advanced to a minimum of $44 base, Birmingham, for 6-in. and larger.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $56.20 to $57.20; 6-in. and above $52.20 to $53.20; class A and gas pipe, $3 extra.

Wire Products.—Under the insistent demand, neither mills nor jobbers are able to build up stocks and with manufacturing consumers expanding their operations the situation is growing even more tense. The pressure for nails is very strong, as continued mild weather has favored winter building activity. The leading interest is sold out on poultry netting, a seasonal commodity which must be disposed of by retail dealers before May 1. All producers have heavy commitments and there is some talk of advances in galvanizing extras.

The [illegible]most producer has not yet advanced its prices to the independent level. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 313.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.45; No. 9 and heavier bright basic wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $2.80 per keg.

Rails and Track Supplies.—Standard spikes and track bolts have advanced $3 a ton to 3c. and 4c., mill, respectively. Steel tie plates have gone up $2 a ton to 2.45c., mill. Small orders for track supplies continue to be placed, but the bulk of new tonnage is coming in in the form of specifications.

Standard Bessemer and open-hearth rails, $43; light rails rolled steel, 2.15c., f.o.b. makers' mills.
Standard railroad spikes, 3c., mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.45c. f.o.b. mill; angle bars, 2.75c., f.o.b. mill.
Jobbers quote standard spikes out of warehouse at 3.65c. base and track bolts, 4.65c. base.

Bars.—Chicago mills are booked through the quarter on soft steel bars and mills east of here have advanced to a minimum of 2.10c., Pittsburgh. As the scarcity of soft steel grows more pronounced, the demand for bar iron and rail steel bars is increasing. Business in the latter commodities is not yet heavy, but it is expected to come into its own within a few weeks.

Mill prices are: Mild steel bars, 2.10c., Chicago; common bar iron, 2.35c. to 2.50c., Chicago; rail steel, 2c., Chicago mill.
Jobbers quote, 2.95c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.
Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 4.30c.; bands, 3.75c.

Bolts and Nuts.—With an excellent demand from the automobile industry and the railroads, as well as from general sources, sellers ars holding firmly to the September discounts and in some cases are quoting higher. Business from the farm implement industry is better, although not heavy. Bolt and nut shops are operating at capacity or as nearly so as raw material deliveries will permit. Slow shipments from the steel mills are causing much concern.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ⅞ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Reinforcing Bars.—Lettings have been few during the past week, but there is a large amount of work pending with much more in sight. Concrete bar dealers are heavily booked and are experiencing difficulty in taking care of the business offered. One of the leading sellers of reinforcing bars entered the new year with the second heaviest bookings in history. In sympathy with recent advances in mill prices, local warehouse prices on concrete bars will go up to 2.65c., Feb. 1.

Lettings include:

Hammond Hotel, Hammond, Ind., 160 tons to Truscon Steel Co.

Meyer-Kiser Bank Building, Indianapolis, 235 tons to Hugh J. Baker, Indianapolis.

Missouri highway work, 200 tons to Concrete Steel Co.

Pending work includes:

Illinois highway work, 40 miles of road, 400 tons, general contract awarded to R. F. Conway Co., Chicago.

Junior high school, Holland, Mich., 115 tons, bids in.

Freezer building for George A. Hormel & Co., packer, Austin, Minn., 125 tons.

Katzinger Building, Chicago, 500 tons, new bids asked. (Bids originally asked on this project a year ago.)

Steel Castings.—The large pending tonnage of miscellaneous car castings is still unplaced and the deadlock between the car builders and the steel foundries is unbroken.

Structural Material.—Six fabricating awards reported during the week alone account for 22,300 tons. The amount of pending work is large and prospective projects continue to increase in both number and size. Plans are being completed for a new LaSalle Street railroad passenger terminal to cost $85,000,000 and for a new Dearborn Street terminal to cost $55,000,000. Everything points to a very active year and mills and fabricators alike hope that prices will not advance too rapidly under the stress of heavy demand. The present strength of the market is indicated by the fact that local mills are sold up through first quarter and mills east of here have advanced plain material to a minimum of 2.10c., Pittsburgh.

The mill quotation on plain material is 2.20c., Chicago. Jobbers quote 3.05c. for plain material out of warehouse.

Sheets.—Local producers are fully committed through the quarter and the market continues to gather strength as outside mills fill up. While some business continues to be placed at the minimum quotations carried below, the higher prices are becoming the rule on reasonable early delivery.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.75c. for No. 10 blue annealed and 4.35c. to 4.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.
Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Warehouse Prices.—Local jobbers have advanced a number of commodities in sympathy with stronger mill prices. Plates, shapes, bars, hoops, bands, railroad spikes, track bolts and black annealed wire have each gone up $3 a ton. The new prices are shown under the appropriate market paragraphs. The extra for 3/16-in. plates has been advanced to 22c. per 100 lb. The warehouses are experiencing a heavy demand and are finding it necessary to replenish their stocks of certain sizes of material by buying from mills east of here.

Old Material.—While holders of scrap have shown some inclination to unload at current quotations, offerings have not been heavy and prices remain firm. In fact, whatever weakness might have resulted from more liberal selling of yard stocks was forestalled by a very substantial purchase of heavy melting and allied grades by a leading mill. Fully 30,000 tons is reported to have been bought. Railroad offerings are somewhat heavier, but the amount of prepared scrap available in local and country yards appears to be low. Consumer buying with the one exception noted above has been limited. A fair tonnage of rolling mill grades was recently purchased and knuckles and couplers have been bought by local steel foundries. Carload lots of cast and malleable grades continue to move to the smaller users, but the larger interests remain out if the market. The Santa Fé has advertised 3000 tons and the Burlington 6000 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$23.00 to $23.50
Cast iron car wheels	27.00 to 27.50
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	25.00 to 25.50
Rails for rolling	20.50 to 21.00
Steel rails, less than 3 ft.	22.50 to 23.00
Heavy melting steel	19.25 to 19.75
Frogs, switches and guards cut apart	19.25 to 19.75
Shoveling steel	18.75 to 19.25
Drop forge flashings	15.00 to 15.50
Hydraulic compressed sheets	16.50 to 17.00
Axle turnings	17.00 to 17.50

Per Net Ton

Iron angles and splice bars	23.00 to 23.50
Steel angle bars	19.00 to 19.50
Iron arch bars and transoms	23.00 to 23.50
Iron car axles	26.00 to 26.50
Steel car axles	20.00 to 20.50
No. 1 busheling	16.00 to 16.50
No. 2 busheling	10.50 to 11.00
Cut forge	17.00 to 17.50
Pipe and flues	13.00 to 13.50
No. 1 railroad wrought	18.00 to 18.50
No. 2 railroad wrought	17.00 to 17.50
Steel knuckles and couplers	22.50 to 23.00
Coil springs	23.00 to 23.50
No. 1 machinery cast	21.50 to 22.00
No. 1 railroad cast	20.00 to 20.50
No. 1 agricultural cast	20.00 to 20.50
Low phos. punchings	19.00 to 19.50
Locomotive tires, smooth	18.50 to 19.00
Machine shop turnings	12.00 to 12.50
Cast borings	14.00 to 14.50
Short shoveling turnings	14.00 to 14.50
Stove plate	18.50 to 19.00
Grate bars	18.00 to 18.50
Brake shoes	18.50 to 19.00
Railroad malleable	22.75 to 23.25
Agricultural malleable	22.75 to 23.25

New York

Plate Buying Notable—Inquiry from England and Germany for Coal

NEW YORK, Jan. 23.—Consumers of coal in both Germany and England are investigating as to the possibility of buying coal in the United States, owing to the probable curtailment of supplies from the Ruhr Valley. A quotation has been made on a cargo of coal for export to Germany, but it is very doubtful whether the transaction will be closed. Three British buyers of coal, including one representing the Admiralty, are sounding the market in New York, and an effort is being made to repurchase some Admiralty coal now on its way to this country. The coal and coke markets continue firm, with $8.50 as the usual quotation on furnace grades, Connellsville coke, and $9.50 to $10 on foundry grades. By product is still quoted at $14.84 to $14.91, Newark and Jersey City points.

Pig Iron.—A tight embargo continues on the New Haven, and it is also very difficult to make shipments to Buffalo and numerous other points. A fair volume of business has been done during the past week. The American Locomotive Co. has closed for about 4000 tons, buying Virginia iron, for its Richmond plant, and it is understood the iron for Schenectady and Dunkirk will come from Buffalo. The American Car & Foundry Co. has purchased 500 additional tons. Two lots of 1000 tons have been closed. The Worthington Pump Co. has bought most of the 2000 tons for which it has been inquiring for delivery from February to June. While $28 is the prevailing price at Buffalo, one company which has not a large tonnage to sell is still reported to be quoting $27. In eastern Pennsylvania, the prevailing quotation is $28 for No. 2 plain. On the inquiry of 2000 tons for export to Chile, on which one seller quoted $28, furnace, for No. 2 plain, a quotation $3.50 lower was made by a British company. Quotations on foreign iron are on a somewhat higher basis. Much difficulty is experienced in making deliveries of iron which have been shipped to this country, especially from Boston, owing to railroad conditions.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East Pa. No. 1 fdy., sil. 2.75 to 3.25	$32.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	31.27
East Pa. No. 2 fdy., sil. 1.75 to 2.25	30.27
Buffalo, sil. 1.75 to 2.25	31.91
No. 2X Virginia, sil. 2.25 to 2.75	33.44
No. 2 Virginia, sil. 1.75 to 2.25	32.44

High Speed Steel.—Business is still very much better than during the greater part of last year, but orders are not large. Producers continue to quote 75c. to 80c. per lb. on 18 per cent tungsten high speed steel, these prices being firm, and special brands of some companies are selling up to 90c. per lb.

Warehouse Business.—Prices were advanced today by most of the warehouses in this district, including the foremost independent and the leading interest. Bars were increased from a mill basis of 1.95c. per lb., Pittsburgh, to the current base of 2.10c. per lb., Pittsburgh, with a margin between the mill and warehouse prices of $15 per ton. The new quotations are 3.19c. per lb. on iron and steel bars; 3.29c. per lb. base on shapes and plates; hoops 5.04c. per lb. for No. 20 gage and lighter; and bands 3.99c. per lb. Sheet prices continue unchanged at about 4.50c. per lb. on black; 5.25c. to 5.50c. per lb. on galvanized and 4.19c. per lb. on blue annealed. Prices on wire are firm and higher quotations expected. Tire steel has been advanced 10c. per 100-lb. to 3.20c. per lb., and an increase in the quotation on toe calk steel may be made shortly. No change in prices is reported by brass and copper warehouses since December, but quotations are firm and business good. Wrought iron and steel pipe are unchanged for the present, sellers waiting on action by the mills. We quote prices on page 332.

Cast Iron Pipe.—Private buying is strong. One maker in this district reports that the first few weeks of January have been several times larger in tonnage shipped than January of last year. The contract of the City of New York involving 800 tons of 12-in., 18-in. and 20-in. pipe was awarded to the Beaver Engineering & Contracting Co., 51 Chambers Street, New York. The tender of the City of New Bedford, Mass., on 300 tons of water pipe was awarded to the United States Cast Iron Pipe & Foundry Co. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. Business in soil pipe continues fairly active, but jobbers are evidently becoming filled up. The rail embargoes are proving obstacles to early shipments. We quote discounts of both Southern and Northern makers, delivered New York, as follows: 2 to 6-in. standard, 23 to 25¾ per cent off list; heavy, 33 to 35¾ per cent off list.

Ferroalloys.—Demand for ferroalloys is very light, and no sales have been noted at the new price of $107.50. The little business before the market is confined to carloads and small lots. Heavy sales of spiegeleisen have been made, one transaction amounting to about 10,000 tons. Prices have been advanced so that 19 to 21 per cent grade is quoted at $37, furnace, with the lower grade at $36, in carload or larger lots. There have been no developments in the manganese ore market. The 50 per cent ferrosilicon market is quiet and there are indications that it is slightly easier, it being possible to buy the alloy in some quarters as low as $82.50, delivered. The general range of prices, however, is unchanged. Quotations are as follows:

Ferromanganese, domestic, furnace, per ton	$107.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port	$107.50
Spiegeleisen, 17 to 19 per cent, furnace	$35.00 to $37.00
Spiegeleisen, 20 per cent, furnace or duty paid	$34.00 to $36.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$82.50 to $87.50
Ferrotungsten, per lb. of contained metal,	90c. to 95c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	13c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00

Ores

Manganese ore, foreign, per unit, c.i.f.	29c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$7.50 to $8.50
Chrome ore, basic 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to $28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	60c. to 70c.

Finished Iron and Steel.—The market is stronger than a week ago, with practically all mills quoting 2.10c., Pittsburgh, on plates, shapes and bars for reasonably early delivery. Mills which were willing to accept limited tonnages at 2c. early last week declined business late in the week at that price. Quotations where protections had been given are fast expiring. Of such business about 1000 tons of plates was placed with an Eastern mill at 1.95c., Pittsburgh. Plates have been in pretty good demand. The Standard Oil Co. of New Jersey bought about 1200 tons, the Newport News Shipbuilding & Dry Dock Co. about 900 tons, and the Tidewater Oil Co. bought several hundred tons. Demand for structural steel continues in good volume, last week's awards including tanks to be built in Wyoming for the Sinclair Crude Oil Purchasing Co., requiring 9000 tons of plates. Steel buildings to be erected in the New York district, for which contracts were awarded during the week, call for about 11,000 tons of steel, and work which probably will be closed this week aggregates not less than 30,000 tons. Many of the steel companies are virtually out of the market on a majority of steel products. One of the exceptions is cold finished steel bars, which are freely obtainable at 2.50c., Pittsburgh, demand in relation to supply not being on a par with hot rolled products. Bar iron has been advanced along with steel bars to a minimum of 2.10c., Pittsburgh, and some small makers are getting 2.15c. for quick deliveries.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, plates and structural shapes, 2.44c.; bar iron, 2.44c.

Old Material.—The market is strong and prices continue upward on all grades as mills pay higher prices and the shortage of material increases. Western

Pennsylvania mills are slightly less active than for several weeks, but increased activity is reported in eastern Pennsylvania. For delivery to Bethlehem, as high as $20 per ton is being paid on railroad quality of heavy melting steel and $20.50 to $21 per ton is current for delivery to Pottsville. The Lukens Steel Co., which recently came into the market for No. 1 heavy melting steel at $18 per ton, is not receiving much material at this price. No. 1 heavy melting steel is quotable, New York, at $16 to $16.50 per ton with railroad quality at $16.75 to $17.25. Some brokers are paying slightly higher than these prices. Stove plate is slightly higher this week at $14.50 to $15 per ton, and forge fire is quoted at $12.50 to $13.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$16.00 to $16.50
Steel rails, short lengths, or equivalent	16.75 to 17.25
Rails for rolling	18.00 to 18.50
Relaying rails, nominal	26.00 to 27.00
Steel car axles	19.50 to 20.00
Iron car axles	26.00 to 27.00
No. 1 railroad wrought	18.00 to 18.50
Wrought iron track	16.25 to 16.75
Forge fire	12.50 to 13.00
No. 1 yard wrought, long	16.50 to 17.00
Cast borings (clean)	13.50 to 14.00
Machine-shop turnings	13.50 to 14.00
Mixed borings and turnings	13.50 to 14.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	13.25 to 13.75
Stove plate	14.50 to 15.00
Locomotive grate bars	14.50 to 15.00
Malleable cast (railroad)	15.50 to 16.00
Cast-iron car wheels	19.00 to 19.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$22.00 to $23.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	17.00 to 18.00
No. 2 cast (radiators, cast boilers, etc.)	17.50 to 18.50

Buffalo

Railroad Service Poor—Fair Amount of Pig Iron Buying in Small Lots

BUFFALO, Jan. 23.—While most melters of pig iron have covered their wants, there is a goodly number of 100 to 200-ton lot buyers interested; much of this demand is from the East. The $28 base still rules and $1 differential is maintained without difficulty. The Wickwire Steel Co. is operating its two furnaces on foundry iron. Two attractive inquiries engaged Buffalo sellers, one for 3000 tons of foundry and one of 1000 tons; on the latter, action is withheld by the prospective purchaser and the iron will not be purchased at this time. One furnace closed the week with 10,000 tons inquired for and sales of 1000 tons. Malleable is quoted at $29. The railroad situation continues to embarrass, embargoes by the Pennsylvania system seriously interfering with delivery.

We quote f.o.b. per gross ton Buffalo as follows, the higher price being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$29.00 to $30.00
No. 2X foundry, 2.25 to 2.75 sil.	28.00 to 28.50
No. 2 plain, 1.75 to 2.25 sil.	27.00 to 28.00
Basic	27.00
Malleable	28.00
Lake Superior charcoal	33.28

Finished Iron and Steel.—Further withdrawal from the selling field by local agencies has tightened the Buffalo situation. The leading sheet interest has withdrawn, having obligated itself for as much tonnage as it can expect to deliver. The branch office of an independent has withdrawn on all products except black sheets, and while some sellers are quoting 3.50c. on black sheets, orders are still being accepted by this office at 3.35c. Bar inquiry is especially brisk. The Buffalo Steel Car Co. is inquiring for 1000 to 1500 tons of plates. No improvement in the labor situation is apparent, notwithstanding the suspension of outdoor work which ordinarily improves steel mill operation.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Warehouse Business.—Orders from a wider range and for quantities in excess of usual warehouse demand indicate that much business is coming from consumers disappointed in mill schedules and failures in deliveries. Bar demand is especially brisk.

Coke.—Foundry grades sold at $10 and the supply is extremely limited. Furnace grades range from $8.50 to $9.00.

Old Material.—The car situation is having a bad effect on sales and, of course, deliveries. All mills but one are active and some good sized sales of heavy melting steel at $21 have been made. Cast scrap is very active and is expected to go to $24 for heavy melting.

We quote dealers, asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$21.00 to $21.50
Low phos., 0.04 and under	23.00 to 23.50
No. 1 railroad wrought	18.00 to 19.00
Car wheels	22.00 to 23.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	17.00 to 17.50
Heavy axle turnings	18.50 to 19.50
Grate bars	18.00 to 18.50
No. 1 busheling	19.00 to 19.50
Stove plate	19.00 to 19.50
Bundled sheet stampings	15.50 to 16.00
No. 1 machinery cast	22.50 to 23.50
Hydraulic compressed	19.00 to 20.00
Railroad malleable	23.00 to 23.50

Birmingham

Buying Pig Iron for Second Quarter on Basis of $24

BIRMINGHAM, ALA., Jan. 23.—By Jan. 20, $23 iron had practically disappeared from the Birmingham market. In some instances $23 base was charged on higher silicon iron, but the base grade of 1.75 to 2.25 was placed at not less than $24. While second quarter business had not begun in earnest, two of the smaller makers booked about 10,000 tons for that delivery on the base of $24. A typical booking was 1500 tons for February, March and April delivery to a Southern consumer at $24 base. One maker made total bookings of this nature amounting to 3000 tons. Buyers themselves do not claim to be able to place spot orders under $24. The exception might be especially desirable tonnage. Other makers are rather pleased than not that the leading foundry producer placed 30,000 tons of rail and water iron in the Chicago district, being gratified that all producers are so well cared for in the first quarter. One small producer has booked capacity and yard stocks for entire first quarter. Cincinnati and northern Ohio territory bought numerous lots of 300 to 500 tons at $24 last week. The Tennessee company blew in a fourth stack at Bessemer on foundry last Friday and has seven on basic. It is repairing Oxmoor furnace, which with Little Belle at Bessemer is the only idle stack. The six Ensley furnaces of this company made a new high record in December with a production of 81,180 tons compared with the previous high of 80,875 tons in January, 1920. The Republic Iron & Steel Co.'s No. 3 furnace produced 414 tons of three high grades of iron on Jan. 17 on a rating of 300 tons. The Alabama Co. fully expects to blow in a second stack at Gadsden Feb. 1. Shipments are reducing stocks rapidly. We quote per gross ton f.o.b. Birmingham district furnaces as follows:

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$24.00
Basic	23.00
Charcoal, warm blast	32.00

Finishing Mills.—All steel mills are at or near capacity. Wire drawing mills groan under orders. The American Steel & Wire Co. is moving considerable tonnage to Houston warehouses via Warrior River and ocean-going barges out of Mobile. Work has begun on nine steel barges for use of the Tennessee company for bringing in Brazilian ore and sending steel products down the Warrior for export. Northern mills are declining orders for steel sheets and pipe. Steel bars are firm at 2.25c. to 2.40c. and the tendency is to advance. Track accessories and spike mills are pushed to capacity to meet demands.

Cast Iron Pipe.—Pressure pipe makers say that if the demand keeps up present pace they will soon be unable to promise deliveries. The United States Cast Iron Pipe & Foundry Co. is disposing easily of capacity 6 to 12 in. make of the four De Lavaud machines in the North Birmingham plant. St. Paul has placed 3000

tons and Southern orders, while in small lots, aggregate a large tonnage. The base is $43 for attractive business and $44 for small tonnages. Some sanitary pipe is still selling at $65, but the general base remains at $60. The market is very strong.

Coal and Coke.—Large tonnages of by-product coke are going to Chicago for domestic use. Spot coke is bringing $8 to $9. A proffer of a contract for 2000 tons a month for six months found no takers on account of sold-up condition on contracts. Walter Moore, president of the Empire Coal Co., says plans for a 50-oven by-product plant at mines in Walker county are being worked out and he expects soon to announce the perfection of the plans. He says the type of oven has not been selected.

Old Material.—All kinds of scrap are moving well but without appreciable changes in price.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

Boston

Railroad Conditions Serious—Fuel Situation Acute—Scrap Prices Advance

BOSTON, Jan. 23.—The pig iron market is dominated by the railroad embargo situation. The only route into New England not subject to permits is through Portland, Me., via the Grank Trunk. Permits to ship via the Boston & Maine, Boston & Albany and New Haven roads have been obtained, but very few. Where shipments are permitted, long delays in transportation are experienced because of congestion at New England gateways. Furnaces, unable to guarantee shipments, were obliged to turn down business the past week. Sales therefore dropped to unimportant proportions. Because of the embargoes and because of the sold-up condition of furnaces for the first quarter, there is a perceptible, although not pronounced, strengthening in eastern Pennsylvania and Buffalo prices. Buffalo iron at $27, furnace, base, appears to have disappeared, $27.50 being the lowest price named recently, while $28 evidently is the maximum. No offerings of eastern Pennsylvania iron at less than $28 base are noted, while $29 appeared to be the maximum. Private letters predict $30 iron within the next ten days. Prices for Alabama and Virginia remain as heretofore. A New Jersey furnace with a $3.66 freight into New England is understood to have taken 1000 tons No. 2X, February and March delivery, at approximately $27, furnace, base. A Worcester, Mass., textile machinery maker's inquiry for 600 tons turned out to be for inventory purposes. A lot of 1000 tons Scotch, silicon 2.75, is offered at $29.25 on dock, duty paid, but most owners of such iron ask nearer $30, with and without the duty. French, silicon 2.50 plus, regular phosphorus, spot shipments, is obtainable at $28.50 on dock here, while high phosphorus is 50c. to 75c. a ton less. Little English iron is obtainable. Sales of spot foreign iron are limited largely because of the inability to obtain cars to make shipments.

We quote delivered prices on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

Eastern Penn., sil. 2.25 to 2.75	$32.15 to $33.65
Eastern Penn., sil. 1.75 to 2.25	31.65 to 32.65
Buffalo, sil. 2.25 to 2.75	32.91 to 33.41
Buffalo, sil. 1.75 to 2.25	32.41 to 32.91
Virginia, sil. 2.25 to 2.75	33.42 to 34.42
Virginia, sil. 1.75 to 2.25	32.92 to 33.92
Alabama, sil. 2.25 to 2.75	34.10 to 35.10
Alabama, sil. 1.75 to 2.25	33.60 to 34.60

Warehouse Business.—Local warehouses have advanced steel bars, flats, bands, hoops, tire steel, structural steel and plates $3 a ton, sheets slightly less, and refined iron $3. Other grades of iron as well as open-hearth and crucible spring, cold rolled and toe calk steel remain unchanged in price. With a modification of weather conditions, there is an improvement in the movement of iron and steel from warehouses. Bars, shapes, plates and sheets are moving and selling on a larger scale than at any previous period this month. The demand for bolts and nuts has increased, and because of railroad embargoes local stocks are becoming thin. Anything in bolts ⅝ in. diameter and smaller is in limited supply. Stocks of chain, with the exception of the largest sizes, have been liquidated.

Jobbers quote: Soft steel bars, $3.065 per 100 lb. base; flats, $3.85; concrete bars, 3.16½c.; structural steel, $3.065 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.065; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6.60 to $7.10; plates, 3.16½c. to $3.35; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Iron Importations.—During the week ending Jan. 20, importations of pig iron amounted to 4241 tons of Belgian, contrasted with 12,628 tons (corrected) for the previous week. Importations for the previous week were made up as follows: Belgian 560 tons, Scotch 2025 tons, English 5742 tons, English spiegeleisen 230 tons and German 4071. For January to date, arrivals of foreign iron at this port aggregate 20,321 tons.

Cast Iron Pipe.—The Metropolitan District Commission, State House, Boston, contemplates an extension of a force main, and shortly will ask bids on 3300 to 3400 tons of 60 in. pipe. The city of Woonsocket, R. I., will receive bids until Feb. 7 on 2000 tons of 30 in. pipe. The United States Cast Iron Pipe & Foundry Co. was the low bidder on 700 tons of 4-in., 6-in., 8-in. and 12-in. pipe for Providence, R. I. Indications are the pipe market will be unusually busy during the next month or so, inasmuch as several municipalities and other large users will, it is understood, cover their requirements. The market here on cast iron pipe in car lots is $65.10 delivered common Boston rate points for 4 in., $59.10 for 6 in., 8 in. and 10 in., and $58.10 for 16 in. and larger. The usual $3 differential applies to class A and gas pipe.

Coke.—Forty-eight hour and foundry Connellsville cokes continue in excellent demand, the former at around $8.50 on cars at ovens or $14.05 delivered, and foundry at $9.25 to $9.50 ovens or $14.80 to $15.05 delivered. Shipments of such fuel, however, are subject to delay, and in some instances railroads have refused to handle additional business. The New England Coal & Coke Co. continues to quote by-product foundry coke at $16 and the Providence Gas Co. at $15 delivered within the $3.10 freight zone. Both firms are experiencing great difficulty in making deliveries, due to the car situation. With shipments from all points held up, foundries, particularly those in Maine and Vermont, are beginning to feel a pinch in coke. Various instances are cited where foundries are beginning to fall behind on delivery of castings due to insufficient supply of fuel. It is doubtful if ever before has the New England foundry fuel situation been as acute as it is today.

Old Material.—Higher prices reflect an increased demand for old material in this territory. Heretofore mills in the Pittsburgh district were the most active interests in the market. Today, however, eastern Pennsylvania consumers are far in the lead. Their requirements include heavy melting steel, average prices for which show an advance of 50c. at $16 to $16.50, although $16.75 on cars shipping point was paid the past week. Wrought pipe is all of $1 higher at $12 to $12.50 on cars, while forged scrap and bundled skeleton and rails for re-rolling have gone up as much, the former to $12 to $12.50, and the latter to $16 to $16.50. Railroad wrought is fully $1 higher, largely because of a lack of material, and railroad malleable also is in limited supply. All kinds of turnings and borings command stiff prices, with few obtainable. The inability of some New England foundries to secure pig iron is resulting in a larger scrap melt, and consumers have paid as high as $23 delivered for car lots of No. 1 machinery cast of ordinary selection. Even No. 2 machinery, for which there has been little call, is desired by foundries. Although the transportation situation is

still a big factor in the market, dealers have been able to make fairly liberal shipments out of New England.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.50 to 23.00
No. 2 machinery cast	20.50 to 21.00
Stove plate	16.50 to 17.00
Railroad malleable	21.50 to 22.00
Bundled sheets	14.00 to 14.50
Car wheels	20.00 to 21.00

The following prices are offered per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$16.00 to $16.50
No. 1 railroad wrought	16.00 to 16.50
No. 1 yard wrought	14.00 to 14.50
Wrought pipe (1 in. in diam., over 2 ft. long)	12.00 to 12.50
Machine shop turnings, free of bushings	12.00 to 12.50
Machine shop turnings, regular	11.50 to 12.00
Cast iron borings, rolling mill	13.00 to 13.50
Cast iron borings, chemical	17.00 to 17.50
Blast furnace borings and turnings	12.00 to 12.50
Bundled forged scrap	12.00 to 12.50
Axles	20.00 to 20.50
Shafting	20.00 to 21.00
Rails for rolling	16.00 to 16.50

Cincinnati

Steel Maker Buys 15,000 Tons of Basic — Southern Basis $24

CINCINNATI, Jan. 23.—The pig iron market has not been especially active in standard grades and sales reported generally run from carload lots to 200 tons. On special irons, however, a number of round tonnage lots were disposed of. An Ohio River steel maker is reported to have bought its second quarter requirements of basic, about 15,000 tons, from another Ohio River steel interest, at an unnamed price. A Michigan melter bought 1500 tons of silvery for early shipment, and another Michigan melter took 1000 tons for second quarter delivery. A Pittsburgh district rolls maker is reported as having closed on 1600 tons of Southern charcoal iron. Silvery prices have been advanced $1 a ton, the quotation on 8 per cent now being $36.50. On Southern irons, the $23 price has practically disappeared, and $24 for prompt and $25 for second quarter are the ruling quotations. Northern iron is unchanged at $27.50, Ironton, although it is expected that an advance of $1 a ton will be announced this week. Very little second quarter business has yet been booked, and furnaces are not actively soliciting orders for this delivery, as they feel that prices are on the up grade. It is well known in the trade that production costs at present are higher than selling prices in some districts and some furnaces in blast have made no attempt to sell iron. However, little iron is being piled, as the consumption about balances production.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$28.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	28.55
Ohio silvery, 8 per cent	38.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	29.77
Basic Northern	29.27
Malleable	29.77

Warehouse Business.—The demand continues for bars, shapes and plates, and some fair-sized orders for concrete bars for rush work are being placed. Cold-rolled shafting is also in better demand, and wire products are moving fast, with jobbers reporting difficulty in securing sufficient wire nails to take care of the trade. Prices are very firm.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.10 per 100 lb.; common wire nails, $3.20 per keg, base.

Tool Steel.—Manufacturing operations are steadily increasing, and while orders are small, they are coming with more frequency. The price situation is strong, 18 per cent tungsten high speed steel being quoted at 75c. per lb., base, with several brands running up to 95c.

Finished Material.—The demand for all kinds of finished materials is heavy, a local representative of a large independent company reporting that even in the war period such a rush for materials in early January was not experienced. Bars, shapes and plates are hard to obtain for first quarter delivery, and a number of mills have withdrawn from the market entirely on bars. Shapes and plates deliveries are getting further behind, and nine to ten weeks is now the best promise obtainable. It is said that some mills have a little capacity open for early delivery, but are loath to book up solid, as regular customers' needs are to receive first consideration, and the demand for plates is such that it is felt that additional tonnages over that contracted for will be required. Prices generally quoted are 2c. on bars, and 2c. to 2.10c. on shapes and plates. A large independent mill has not followed as yet the advance on shapes and plates, but as delivery promises are rather indefinite, little significance is attached to its position. The Steel Corporation is understood to be quoting 2c. on bars, and 2.10c. on shapes and plates on all new business, with indefinite deliveries promised, and rumors are current that prices on bars will shortly advance at least $2 per ton. Some mills which make a specialty of concrete reinforcing bars are now quoting 2.25c., and are getting business. On sheets, 2.85c. has been quoted on blue annealed, and on black and galvanized 3.50c. and 4.50c. are more common among independent mills. Premiums are now being offered for early delivery of blue annealed, but the market has not yet reached 2.75c. The demand for wire products is heavy, with many mills allotting tonnages to regular customers. Carload orders for nails are not attractive, and independent mills are having little difficulty in maintaining the recent advance. There is little new activity in the structural field. The U. S. Engineers' Office, Cincinnati, will open bids Feb. 8 for 650 tons of horses and props for dams 34 and 36 on the Ohio River. The A. J. Krebs Construction Co., Atlanta, is low bidder on the War Memorial Building, Nashville, Tenn., but the steel, 950 tons, has not been placed. A storage building at Erie, Penn., which a Cincinnati contractor will erect, will take approximately 800 tons of reinforcing bars.

Coke.—Increasing activity in metallurgical fuels is noted, but railroad embargoes are making it difficult for coke to move to consumers, and coke available for quick shipment is quickly taken up. Prices are about the same as last week, although on domestic fuels the market is off about 25c.

Old Material.—The local market is showing activity though most of the business is coming from other districts. Prices are stronger on grades which are in demand, notably steel and blast furnace scrap. Prices are expected to advance further as dealers report a scarcity of materials.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.00 to $13.50
Iron rails	17.00 to 17.50
Relaying rails, 50 lb. and up	26.00 to 27.00
Rails for rolling	18.00 to 18.50
Heavy melting steel	18.00 to 18.50
Steel rails for melting	16.00 to 16.50
Car wheels	20.00 to 20.50
Per Net Ton	
No. 1 railroad wrought	15.00 to 15.50
Cast borings	12.00 to 12.50
Steel turnings	11.50 to 12.00
Railroad cast	17.50 to 18.00
No. 1 machinery cast	20.50 to 21.00
Burnt scrap	11.50 to 12.00
Iron axles	21.50 to 22.00
Locomotive tires (smooth inside)	15.00 to 15.50
Pipes and flues	12.00 to 12.50

Detroit Scrap Market

DETROIT, Jan. 23.—The market has a firm tendency and few sales have been recorded during the past week. Dealers are inclined to increase their stocks, which are large in most cases. Prices on all waste materials are approximately the same as quoted a week ago.

The following prices are on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$16.75 to $18.00
Shoveling steel	16.75 to 18.00
No. 1 machinery cast	19.00 to 21.00
Cast borings	13.50 to 14.50
Automobile cast scrap	21.00 to 23.00
Stove plate	15.00 to 16.00
Hydraulic compressed	15.50 to 16.50
Turnings	12.50 to 13.50

Cleveland

Mills Falling Behind on Deliveries and Turning Down Tonnages

CLEVELAND, Jan. 23.—The demand for finished iron and steel continues heavy and mills are getting farther behind on deliveries and with orders on their books that will be carried well into the second quarter they are turning down an increasing amount of tonnage that is offered. Prices continue to work higher. Steel bars can still be bought at 2c. for desirable orders, but 2.10c. is the more common price and the minimum for small lots. Plates are very firm at a minimum of 2.10c., and considerable business is being booked at 2.25c. While an inquiry for a round lot of structural material would probably bring out a 2c. price, most mills are now quoting a minimum of 2.10c. on plain material. With advancing prices builders are hurrying plans for prospective work in order to place contracts before prices are farther advanced. One inquiry is for a building that will take a large tonnage that will not be required before August. Another lake boat has been placed, a freighter for the Reiss Steamship Co., which went to the Toledo Ship Building Co. This will require 5000 tons of steel. The McKinney Steel Co. has placed contracts for rebuilding two blast furnaces in Cleveland and for ore bins requiring 4500 tons of plates and structural material. Considerable business largely in steel bars is coming from manufacturers of automobile parts, and there is a good demand for special sections for automobile rims. Rail steel reinforcing bars are firmer, prices below 2c. apparently having disappeared.

Jobbers quote steel bars, 3.06c.; plates and structural shapes, 3.16c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.50c. to 3.76c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.; hoops and bands, 1 in. and wider and No. 20 gage or heavier, 3.84c.; narrower than 1 in. or lighter than No. 20 gage, 4.36c.

Pig Iron.—Foundries are beginning to show an interest in second quarter contracts and some buying for that delivery is expected shortly. Producers as a rule so far have declined to take second quarter tonnage, but some furnaces are now considering opening their books for that quarter. One interest which previously took a limited amount of second quarter business took a few additional lots during the week for that delivery, aggregating about 1000 tons, and made a few other sales for deliveries extending into the second quarter. The market is rather quiet, although one producer reports the sale of over 11,000 tons including two 1000 ton lots of foundry iron taken by Indiana melters, activity being mostly confined to that State. A South Bend consumer is inquiring for 750 tons of foundry iron and a Richmond, Ind., implement manufacturer for 250 to 500 tons. The Cleveland price on foundry is unchanged at a minimum of $27 for outside shipment and $27.50, furnace, for local delivery, although a sale of 200 tons was made to a Canton consumer at $27.50. One lake furnace interest has advanced prices 50c. to $1 a ton. The minimum Toledo price is now $29 and a western Pennsylvania furnace has gone from $27.50 to $28. Some producers that are now quoting the highest prices are well sold out for the first quarter and may decide to name somewhat lower prices for the second quarter. It is understood that some Michigan foundries will need additional iron for the first quarter, which furnaces in that State will be unable to supply. Southern foundry iron has advanced $2 a ton to $25, Birmingham, at which some small lots sales have been made and Ohio silvery iron has advanced $1 a ton to $36.50 for 8 per cent Bessemer. Ferrosilicon has also advanced $1. There is no activity in steel making iron.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham.

Basic, Valley furnace	$27.00
Northern No. 2 fdy., sil. 1.75 to 2.25	28.00
Southern fdy., sil. 1.75 to 2.25	$30.00 to 31.00
Malleable	28.00
Ohio survey, nominal, 8 per cent	39.52
Standard low phos., Valley furnace	35.00

Iron Ore.—Nearly 5,000,000 tons of Lake Superior ore was consumed during December, the exact amount being 4,845,196 gross tons as compared with 4,389,996 tons in November. The amount consumed in December, 1921, was 2,577,156 tons. On Jan. 1 there was 39,866,049 tons on hand at furnaces and Lake Erie docks as compared with 35,895,579 tons on the same date a year ago and with 44,004,201 on Dec. 1. The amount at furnaces on Jan. 1 was 30,632,456 tons.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers are getting a heavy volume of specifications on contracts from railroads, automobile and implement manufacturers and jobbers and some current orders from smaller consumers not under contract. Prices are firm at recent levels. Large buyers are still allowed 10 per cent additional to the regular discounts, but there is some talk of higher prices. Rivet manufacturers are getting heavy specifications on contracts. Regular prices are being shaded $1 to $2 a ton for spot shipment orders only.

Sheets.—The demand continues heavy, particularly from the automobile trade, and mills are about filled up for the first quarter. Some mills are having no trouble in getting 2.75c. for blue annealed sheets and some have advanced galvanized sheets to 4.50c.

Wire Products.—New wire extras for size and galvanizing are being placed in effect by the leading producer and independent mills. The new extra on wire coarser than ¼ in. is 10c., and on ¼ in. to No. 5, 5c. Formerly there were no extras on these sizes. The extras on No. 16 and No. 17 are increased 5c., and on No. 18 from 85c. to $1.50. The new extra for galvanizing for No. 8 and coarser is 75c., an increase of 25c. For Nos. 9, 10 and 11 the extra is 60c., or a 10c. increase, and extras for smaller sizes have been increased, except for Nos. 17 and 18.

Warehouse Business.—Warehouse prices have been advanced $3 a ton on steel bars, plates and structural shapes, and on hoops, except narrow widths or light gages, which have been advanced $13 per ton.

Semi-Finished Steel.—Most consumers have their first quarter requirements under contract and mills are filled with orders for that delivery; consequently the market is inactive. The market appears firm at $38.50, and a Valley mill has turned down an offer at that price for sheet bars, being unable to take on additional tonnage.

Coke.—Standard Connellsville foundry coke is being offered at $9.25 for prompt shipment although as high as $10 is being asked. While the supply is scarce, it seems sufficient to meet requirements. Wise County foundry coke is quoted for prompt shipment at $8.50.

Old Material.—Although the market is rather quiet, prices, which for a few days were slightly easy have stiffened. Quotations are unchanged from last week except on drop forge flashings which advanced 50c. to $1 a ton. Local mills which recently bought considerable scrap are out of the market but some activity is reported in the Mahoning Valley district. There is considerable trading between dealers largely in boring, turnings and compressed steel. As high as $23 has been paid by a dealer for heavy melting steel scrap for Youngstown district delivery.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$20.50 to $20.75
Rails for rolling	22.00 to 23.00
Steel rails under 3 ft.	21.25 to 22.00
Iron rails	18.00 to 18.50
Iron car axles	25.00 to 26.00
Low phosphorus melting	21.50 to 22.00
Cast borings	18.00 to 18.50
Machine shop turnings	16.00 to 16.25
Mixed borings and short turnings	17.00 to 17.50
Compressed steel	18.50 to 19.00
Railroad wrought	19.00 to 19.50
Railroad malleable	22.00 to 23.00
Light bundled sheet stampings	16.50 to 17.00
Steel axle turnings	18.00 to 18.50
No. 1 cast	21.00 to 22.00
No. 1 busheling	17.25 to 17.50
Drop forge flashings over 10 in.	15.00 to 15.50
Drop forge flashings under 10 in.	16.00 to 16.50
Railroad grate bars	18.00 to 18.50
Stove plate	18.00 to 18.50
Pipes and flues	15.50 to 16.00

Philadelphia

Rise in Quotations of Iron and Steel Scrap Continues Unchecked

PHILADELPHIA, Jan. 23.—The rapid rise in the price of steel scrap, accompanied by corresponding advances in all other grades of old material, is the cause of concern among steel companies whose costs are thus forced up another notch. It is stated that one large independent company is considering resorting to the duplexing process if the advance continues. In the middle of December, No. 1 heavy melting steel was obtainable at $16, delivered at eastern Pennsylvania steel plants. Today it is $22, with indications that it will go higher. An Eastern steel mill which a few weeks ago bought 10,000 tons at $18 has within the past few days paid $22 for an additional 10,000 tons.

In other years when steel scrap has reached top prices, it has been possible to import large quantities from England and on several occasions the market price has been broken in this way. Cable advices from England within the past few days disclose that English steel scrap could not be laid down at Philadelphia for less than $25 a ton. Nor is the situation much better on the Continent, there being no scrap available in Belgium in sufficient tonnages to make it worth while importing. Meager amounts come in from Cuba and Panama, but these are readily absorbed and have no effect on the market.

The advance in prices of finished steel continues. One or two companies have advanced plates to 2.15c., Pittsburgh, while 2.25c. is being more frequently paid for small lots of plates, shapes and bars. Bar iron makers have advanced quotations to 2.15c., Pittsburgh, for carload lots and to 2.25c. for less than carloads. An advance of $3 a ton on steel out of jobbers' stocks will be put into effect this week by Philadelphia warehouses. Foundry iron prices are unchanged, but basic is 50c. per ton higher.

Pig Iron.—With easier coke prices and less pressure from consumers for contracts the pig iron trade has settled down to a routine of average buying. Sales during the past week have not been large, but are fairly satisfactory, considering the fact that many consumers are well covered for first quarter. One of the largest purchases was 4000 tons, half domestic and half foreign iron, by an eastern Pennsylvania cast iron pipe company. A Virginia pipe company has taken 3000 tons, but whether this was Virginia or Alabama iron is not known here. A Delaware steel company seeking basic iron has been quoted $28.50, delivered, as a minimum, which is 50c. a ton higher than was paid on a purchase of 5000 tons by another company about two or three weeks ago. Foreign iron continues to come in in fair quantities, last week's receipts at this port totaling 3740 tons, of which 1502 tons was from Nova Scotia, 1500 tons from England, 150 tons from France and 588 tons from Alsace. Sales of about 6000 tons of foreign low phosphorus iron have been made at a reported price of about $30 duty paid.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$28.76 to $29.14
East. Pa. No. 2X, 2.25 to 2.75 sil.	29.76 to 30.14
East Pa. No. 1X	30.76 to 31.14
Virginia No. 2 plain, 1.75 to 2.25 sil.	32.17 to 33.17
Virginia No. 2 X, 2.25 to 2.75 sil.	33.17 to 34.17
Basic delivered eastern Pa.	28.50
Gray forge	28.00
Malleable	31.14 to 31.26
Standard low phos. (f.o.b. furnace)	35.00
Copper bearing low phos. (f.o.b. furnace)	30.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.

Scotch foundry, 2.50 to 3 sil.	$28.75 to $29.25
English foundry, 1.50 to 2 sil.	28.00 to 28.50
English foundry, 2 to 2.50 sil.	28.50 to 29.00
English foundry, 2.50 to 3 sil.	29.00 to 29.50
Continental foundry, 1.80 to 2.50 sil.	27.50 to 28.00
Continental foundry, 2.50 to 3 sil.	27.75 to 28.75
Low phos., copper free, guar. not over 0.035 per cent phos.	28.50 to 29.50

Ore.—Last week's receipts of iron ore from Sweden totaled 4848 tons; from French Africa 6000 tons was received. Chrome ore from French Africa totaled 3000 tons. Ten tons of manganese ore was received from Germany.

Coke.—Spot furnace is slightly easier, being obtainable at $8.25 to $8.50, Connellsville. Blast furnaces are having difficulty in getting shipments of coke under contract and are forced into the market for spot supplies. Foundry coke for spot shipment is obtainable at $9.50.

Ferroalloys.—A shipment of 200 tons of British ferromanganese was received at this port last week. Both British importers and domestic furnaces are quoting $107.50, seaboard, and f.o.b. furnace respectively.

Semi-Finished Steel.—The price of open-hearth rerolling billets has been generally advanced by Eastern mills to $40, Pittsburgh, with $45 quoted for forging quality.

Plates.—The plate market is firm, but business in the past week has been of smaller proportions due to the fact that a good deal of business was closed just prior to the recent advances in prices. One Eastern mill has again advanced its price, now quoting 2.15c., Pittsburgh, but other mills continue to quote 2.10c. A central Pennsylvania mill has withdrawn from the market for the present and will not name new prices until its new costs due to higher prices of raw material have been worked out.

Structural Material.—Mills are well sold ahead and are figuring on a fair volume of new work. There are no indications of a let-up in building work. Mills are generally quoting 2.10c., Pittsburgh, for plain material, but on small lots prices from 2.15c. to 2.25c. have been paid. An unusual sale was a small lot of angles for shipment to Ohio at 2.25c., Eastern mill.

Bars.—Steel bars are not obtainable at less than 2.10c., Pittsburgh, for reasonably early delivery. The best shipment that can be made is about eight weeks, and on some sizes a longer time is required by the mills. Buyers of small lots are frequently asked to pay from $1 to $3 a ton above 2.10c. per lb. Eastern makers of bar iron have advanced prices to the basis of 2.15c., Pittsburgh, with less than carload lots quoted at 2.25c.

Warehouse Business.—Philadelphia steel jobbers will probably advance prices of all finished steel products this week $3 a ton. Business is increasing in volume. We quote, subject to change this week, the following prices for local delivery:

Soft steel bars and small shapes, 3c.; iron bars (except bands), 3c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ x ½ in., 3.20c.; round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.10c.; tank steel plates, ⅜-in., 3.30c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.10c.; diamond pattern plates, ¼-in., 4.80c.; ⅜-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.85c.; square and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to ⅛-in., inclusive, 3.825c.; rails, 3c.; tool steel, 8.50c.; Norway iron, 6.50c.

Old Material.—Further sharp advances in prices of practically all grades of scrap serve to emphasize the remarkable upward trend of the past several weeks. No. 1 heavy melting steel has gone up $6 a ton in about six weeks, while the advances in other grades have been proportionate. Within the past week an Eastern mill has paid $22 for 10,000 of heavy melting steel, and another mill bought a few thousand tons at $21; offers of $25 for low phosphorus scrap have been refused; No. 1 yard wrought is $2 a ton higher as it can be shipped in some instances as No. 1 steel; $18 has been paid for bundled sheets for steel works use; a blast furnace has paid $17.50 for short shoveling turnings; a steel company has paid $18 for machine shop turnings and a rolling mill has paid $19 for turnings; No. 1 cast scrap is up $1 a ton; heavy breakable cast is also up $1 on purchases by a steel plant; railroad grate bars and stove plate have been sold at $19; several hundred tons of malleable scrap has been sold to a cast iron pipe company at about $21; $18.25 and $18.50 have been paid by a rolling mill for pipe scrap. The New

England situation remains unchanged; very little scrap is coming out of that district owing to railroad congestion, a result of recent heavy snows. Predictions of the scrap trade are that No. 1 heavy melting steel will reach $24 or $25 in eastern Pennsylvania within the next few weeks.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$21.00 to $22.00
Scrap rails	21.00 to 22.00
Steel rails for rolling	22.00 to 23.00
No. 1 low phos. heavy 0.04 and under	25.00 to 26.00
Cast iron car wheels	23.50 to 24.50
No. 1 railroad wrought	23.00 to 24.00
No. 1 yard wrought	21.00 to 22.00
No. 1 forge fire	17.50 to 18.50
Bundled sheets (for steel works)	18.00 to 18.50
No. 1 busheling	19.00 to 20.00
Turnings (short shoveling grade for blast furnace use)	17.50 to 18.00
Mixed borings and turnings for blast furnace use	17.00 to 17.50
Machine shop turnings (for steel works use)	18.00 to 18.50
Machine shop turnings (for rolling mill use)	19.00 to 19.50
Heavy axle turnings (or equivalent)	20.00 to 21.00
Cast borings (for steel works and rolling mills)	17.50 to 18.50
Cast borings (for chemical plants)	22.50 to 23.00
No. 1 cast	24.00 to 25.00
Heavy breakable cast (for steel plants)	22.00 to 23.00
Railroad grate bars	19.00 to 19.50
Stove plate (for steel plant use)	19.00 to 19.50
Railroad malleable	19.00 to 19.50
Wrought iron and soft steel pipes and tubes (new specifications)	18.25 to 18.50
Shafting	24.00 to 25.00
Steel axles	24.00 to 25.00

St. Louis

Pig Iron Market Strong with Melters Urging Prompt Shipment

ST. LOUIS, Jan. 23.—The market for pig iron continues strong, with Northern iron quoted at $29 to $30, Chicago, and Southern make at $24 to $25, Birmingham. The melt in this district is reported to be on the increase, and melters are pressing makers for shipments. One St. Louis concern that bought 400 tons of foundry iron from the Granite City maker on Wednesday was asking for shipment of some of this iron on Thursday, a typical example of the insistence of purchasers on shipment. The principal business of the week was done by a Southern maker, whose bookings amounted to about 8500 tons. Inquiries for second quarter are beginning to come in, although there is still a disposition among most melters to make purchases without the formality of general inquiries. The principal inquiry for second quarter is for 3000 tons of foundry iron from a melter in the district. The St. Louis Coke & Chemical Co. is out of the market for nearby delivery. Its sales during the week amounted to between 1000 and 1200 tons. The price is $30.50 to $31.50 f.o.b. Granite City furnace. There is an inquiry before the market for 300 tons of ferrosilicon.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$31.16 to $32.16
Northern malleable, sil. 1.75 to 2.25	31.16 to 32.16
Basic	31.16 to 32.16
Southern fdy., sil. 1.75 to 2.25	29.17 to 30.17

Finished Iron and Steel.—Fabricators of structural steel in St. Louis and other points in this trade territory are showing some interest in purchases of material for stock. Orders range from 50 to 60 tons, the volume of such orders being considerable. Fabricators continue busy, although not much new business has developed recently. However, a considerable volume is in sight. Purchases by warehouses are for a car here and there merely to fill in. Inquiries from the railroads centering in St. Louis are light. The Texas & Pacific Railway wants a carload of steel wheels. The contract for the reinforcing bars (rerolled) for the City Club Building, amounting to 500 tons, went to the Laclede Steel Co.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.85c. per 100 lb.; boiler rivets, 3.95c.; tank rivets, ⅞ in. and smaller, 55 per cent. off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 45 per cent; small, 45 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Coke.—The market for coke continues strong. The local by-product producers are still far behind with the orders. Connellsville coke is still in good demand.

Old Material.—The principal sale of the week was of about 10,000 tons of rails for rolling to the Laclede Steel Co. The market continues strong, with prices from 50c. to 75c. higher on such items as heavy melting steel, heavy shoveling steel, railroad springs, steel couplers and knuckles and No. 1 busheling. Railroad lists are light and country dealers are disinclined to ship material at present prices. Local dealers are also of the opinion that prices will be higher, and they are not disposed to sell at present quotations, although consumers are willing to take on material on this basis.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$20.00 to $20.50
Rails for rolling	21.00 to 21.50
Steel rails, less than 3 ft	22.00 to 22.50
Relaying rails, standard section	26.00 to 29.00
Cast iron car wheels	26.00 to 26.50
Heavy melting steel	17.50 to 18.00
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	17.00 to 17.50
Per Net Ton	
Heavy axles and tire turnings	12.50 to 13.00
Steel angle bars	18.50 to 19.00
Iron car axles	26.50 to 27.00
Steel car axles	21.00 to 21.50
Wrought iron bars and transoms	22.00 to 22.50
No. 1 railroad wrought	17.50 to 18.00
No. 2 railroad wrought	17.00 to 17.50
Railroad springs	22.00 to 22.50
Steel couplers and knuckles	22.00 to 22.50
Cast iron borings	11.00 to 11.50
No. 1 busheling	14.50 to 15.00
No. 1 railroad cast	20.00 to 20.50
No. 1 machinery cast	21.00 to 21.50
Railroad malleable	20.50 to 21.00
Machine shop turnings	9.50 to 10.00

San Francisco

Limited Demand for Foreign Pig Iron—Business in General Quiet

SAN FRANCISCO, Jan. 10.—Interest in pig iron has been light over the holidays and even at present is not pronounced. Demand for foreign iron remains confined to a few orders, involving small tonnages, the aggregate perhaps amounting to about 500 tons. This does not include, however, the reported placing of 500 tons for a Los Angeles account, which was necessitated by the failure in deliveries of previous contracts. Part of the curtailed business is said to be the result of current prices which buyers are not disposed to meet. For good quality foreign iron importers are naming around $33, ex ship, coast ports, duty paid. Lower grades are offered considerably below this figure, ranging from about $26 to $29. Several inquiries and solicitations for Scotch material are heard, but the lack of bottoms and excessive freight rates are making for quotations unattractive to the consumer. The domestic iron situation rules quiet on the coast.

Coke.—New business is inconsequential in foreign coke, since the market is well stocked and several importers have large tonnages coming forward unsold. Demand has not been more than steady. A few carlot orders have been placed for spot domestic material, but the prices reported were excessive. Quotations named on foreign are virtually unchanged at $17, ex ship, coast ports, for beehive, and for "patent" or by-product something like $15. At present, one importer is working on a fair tonnage, but nothing has materialized as yet.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

For additional prices, see page 331

Plates

Sheared, blank quality, base, per lb.....2.10c.

Structural Material

Beams, channels, etc.....2.10c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.10c.
Refined iron bars, base, per lb.....2.75c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb.....2.75c.
Hoops, light gage, under 1 in. wide.....2.90c. to 3.75c.
Bands, base, per lb.....2.75c.
Strips, base, per lb.....2.75c. to 2.90c.

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c. to 2.75c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg	$2.70 to $2.80
Galvanized nails, 1 in. and over	1.50 over base
Galvanized nails, less than 1 in.	2.00 over base
Bright plain wire, base, No. 9 gage per 100 lb.	2.45 to 2.55
Annealed fence wire, base, per 100 lb.	2.60 to 2.70
Spring wire, base, per 100 lb.	3.35 to 3.50
Galvanized wire, No. 9, base, per 100 lb.	3.05 to 3.15
Galvanized barbed, base, per 100 lb.	3.35 to 3.45
Galvanized staples, base, per keg	3.35 to 3.45
Painted barbed wire, base, per 100 lb.	3.00 to 3.10
Polished staples, base, per keg	3.00 to 3.10
Cement coated nails, base, per count keg	2.20 to 2.30
Woven fence, carloads (to jobbers)	70½ per cent off list
Woven fence, carloads (to retailers)	68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads..60 and 5 per cent off list
Machine bolts, small, cut threads...50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 50, 10 and 5 per cent off list
Cut threads .....50 per cent off list
Longer and larger sizes.....50 per cent off list
Lag bolts .....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped..... 3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank..... 325 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, tapped..... 3.25 to 3.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S...75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts .....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets base, per 100 lb.....$3.00
Large boiler rivets, base, per 100 lb..... 3.10
Small rivets .....65 and 10 to 65 and 5 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb.	$2.75
Spikes, ½ in. and smaller, base, per 100 lb.	3.50
Spikes boat and barge, base, per 100 lb.	3.50
Track bolts, base, per 100 lb.	$3.75 to 4.25
Tie plates, per 100 lb.	2.45 to 2.50
Angle bars, base, per 100 lb.	2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	49	23½	¼ to ⅜	+11	+39
¼ to ⅜	55	29½	½	22	2
½	60	46½	¾	28	11
¾	64	52½	1 to 1½	30	13
1 to 3	66	54½			

Lap Weld

2	59	47½	2	23	7
2½ to 6	63	51½	2½	26	11
7 to 8	60	47½	3 to 6	28	13
9 to 12	59	46½	7 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	45	28½	¼ to ⅜	+19	+54
¼ to ⅜	51	34½	½	21	7
½	57	46½	¾	28	12
¾	62	51½	1 to 1½	30	14
1 to 1½	64	53½			
2 to 3	65	54½			

Lap Weld, extra strong, plain ends

2	57	46½	2	23	9
2½ to 4	61	50½	2½ to 4	29	15
4½ to 6	60	49½	4½ to 6	28	14
7 to 8	56	43½	7 to 8	21	7
9 to 12	50	37½	9 to 12	16	3

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel

1¾ in.	21½
2 to 2¼ in.	36
2½ to 3 in.	47
3¼ to 13 in.	52

Charcoal Iron

1½ in.	+12
1¾ to 1⅞ in.	+ 2
2 to 2¼ in.	— 8
2½ to 3 in.	—13
3¼ to 4½ in.	—15

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	55	2½ and 2¾ in.	38
1¼ and 1½ in.	47	3 in.	42
1¾ in.	31	3¼ to 4 in.	47
2 and 2¼ in.	34	4¼ in. and 5 in.	39

Hot Rolled

3 in.	44	3¼ to 4 in.	49

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	14	2¼-in. O.D. 10 gage	19
2-in. O.D. 11 gage	15	3-in. O.D. 7 gage	34
2-in. O.D. 10 gage	16	1½-in. O.D. 9 gage	13¾
2¼-in. O.D. 12 gage	16	5⅝-in. O.D. 9 gage	53
2¼-in. O.D. 11 gage	17	5½-in. O.D. 9 gage	55

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c.
Regular auto body sheets, base (22 gage), per lb., 4.70c. to 5.00c.

Galvanized

No. 28 (base), per lb.....4.35c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.42
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705
Baltimore, export	0.225	Detroit	0.29	St. Paul	0.60
New York, domestic	0.34	Cincinnati	0.29	Omaha	0.735
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705
Boston, domestic	0.365	Chicago	0.34	Denver	1.27
Boston, export	0.255			Denver (pipe)	1.215

Pacific Coast	$1.50
Pac. Coast, ship plates	1.20
Birmingham	0.69
Memphis	0.385
Jacksonville, all rail	0.50
Jacksonville, rail and water	0.415
New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

FABRICATED STEEL BUSINESS

Fully 93,500 Tons Closed, Partly for Tank Work—Considerable New Work

Fabricated steel work awarded in the past week includes the following:

Y. M. C. A. building, Fifty-seventh Street, New York, 2000 tons, to Post & McCord.

Bank building on Fourteenth Street, New York, 100 tons, to McClintic-Marshall Co.

Loft building at Thirtieth Street and Seventh Avenue, New York, 1600 tons, to George A. Just Co.

Manhattan storage warehouse, New York, 1200 tons, to A. E. Norton, Inc.

Mill building at Holyoke, Mass., 750 tons, to Berlin Construction Co.

Grandstand for Danbury Agricultural Society, Danbury, Conn., 350 tons, to Porcupine Co.

Long Island Railroad bridges, 1600 tons, to McClintic-Marshall Co.

Cunningham Piano Co. building, Philadelphia, 1000 tons, to McClintic-Marshall Co.

Clemons Realty Co., building at Seventh Avenue and Thirty-seventh Street, New York, 1500 tons, to George A. Just Co.

Hotel building at Broadway and 100th Street, New York, 1000 tons, to Bethlehem Steel Bridge Corporation.

Hyman apartment building at Fifth Avenue and Tenth Street, New York, 1500 tons, to Bethlehem Steel Bridge Corporation.

Convention hall, Atlantic City, N. J., 400 tons, to a Philadelphia fabricator.

Lehigh & New England Railroad bridges, 400 tons, to Bethlehem Steel Bridge Corporation.

Highway bridge at Haverhill, N. H., 250 tons, to Boston Bridge Works.

Fruit Auction Co., building, New York, awarded to a local fabricator.

Libby-Owens Sheet Glass Co., Charleston, W. Va., factory extension, 1250 tons, to American Bridge Co.

Ford Motor Co., River Rouge, Detroit, cement plant, 1500 tons, to American Bridge Co.

Detroit Edison Electric Co., power house, Trenton, Mich., 8000 tons, to Russel Wheel & Foundry Co.

Hotel, Manchester, N. H., 1030 tons, to McClintic-Marshall Co.

Police station, Boston, 700 tons, to Boston Structural Steel Co., Inc., Cambridge, Mass.

Bridge, Woodsville, N. H., 270 tons, to Boston Bridge Works, Boston.

Sinclair Consolidated Oil Corporation, tanks for Wyoming field, 27,000 tons; 9000 tons each to Chicago Bridge & Iron Works, Riter-Conley Co. and American Bridge Co.

Sinclair Refining Co., 12 55,000-bbl. tanks and 5 80,000-bbl. tanks, 4400 tons, to Graver Corporation, and 62 small tanks and 8 condenser boxes, 3540 tons, to United Iron Works, Eola, Kan., making a total of 7940 tons for work to be erected at Houston, Tex.

John R. Thompson, hotel, Chicago, 10,000 tons, to American Bridge Co.

Office building, Randolph and LaSalle Streets, Chicago, 5000 tons, to American Bridge Co.

Office building, Grand Avenue and Michigan Boulevard, Chicago, 3400 tons, to American Bridge Co.

Columbia Steel Corporation, mill buildings, Pittsburgh, Cal., 1500 tons, to Union Construction Co., Oakland, Cal.

General American Tank Car Corporation, Chicago, plant addition, 1200 tons, to Morava Construction Co.

H. M. Byllesby & Co., Chicago, 1200 tons for a project in Oklahoma, to Minneapolis Steel & Machinery Co.

Pacific Portland Cement Co., buildings, Gerlach, Nev., 789 tons, to Judson Mfg. Co.

Yellow Coach Mfg. Co., factory, Chicago, 985 tons, to Gage Structural Steel Co.

Montreal Mining Co., head frame, idler stands and trestles for No. 5 shaft, Hurley, Wis., 412 tons, to Worden-Allen Co.

Department store addition for Gimbel Bros., Milwaukee, 400 tons, to Worden-Allen Co.

Breaker building for Carey Salt Co., Hutchinson, Kan., 132 tons, to Lakeside Bridge & Steel Co., Milwaukee.

Viaduct for Denver, 120 tons, to Milwaukee Bridge Co.

Missouri Highway Commission, bridge across Gasconade River, 270 tons, to St. Louis Structural Steel Co.

Apartment building, New York; a hotel, Manchester, N. H., and a power house extension, United Gas Improvement Co., Philadelphia, about 2000 tons, all to McClintic-Marshall Co.

McKinney Steel Co., Cleveland, rebuilding two blast furnaces, 3000 tons, to the William B. Pollock Co.

McKinney Steel Co., ore bins, 1500 tons, to the Variety Iron & Steel Works.

Schoolhouse, Wooster, Ohio, 100 tons, to the Niles Forge & Mfg. Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Montville extension, Eastern Connecticut Power Co., 600 tons.

High school, Dorchester, Boston, 600 tons.

Bids were closed this week on the Equitable Building, Thirty-second Street and Seventh Avenue, New York, 18,000 to 20,000 tons; the Roosevelt Hotel, Forty-sixth Street and Madison Avenue, 6000 to 8000 tons, and a telephone exchange in Brooklyn for the New York Telephone Co., 1200 tons, and awards are expected within a few days.

Elks' Building, Newark, N. J., 2000 tons.

Interborough Rapid Transit Co., New York, repairs to elevated structure, 215 tons.

High school building, Philadelphia, 500 tons.

Transit Commission receiving bids on addition to 148th Street shops of Interborough Rapid Transit Co., 450 tons.

Dams 34 and 36, Ohio River, 650 tons, horses and props, bids close Feb. 8.

War Memorial Building, Nashville, Tenn., 950 tons, to A. J. Kreps Construction Co., Atlanta, Ga., low bidder on general contract.

City Club Building, St. Louis, 100 tons in trusses.

Detroit Edison Co., Detroit, power house, 8000 tons.

Galion Iron Works Co., Galion, Ohio, factory addition, 400 tons.

Cleveland Metal Products Co., Cleveland, factory building, 300 tons, bids taken.

Book Hotel, Detroit, 6000 tons.

Masonic Temple, Fort Wayne, Ind., 700 tons, bids taken.

RAILROAD EQUIPMENT BUYING

Four Roads Cover for 140 Locomotives—Canadian Distribution of Equipment Purchases

The Chicago, Rock Island & Pacific Railroad has placed an order with the American Locomotive Co. for 40 locomotives.

The Virginian Railroad has ordered 15 Mallet type locomotives from the American Locomotive Co.

The Illinois Central has contracted with Baldwin Locomotive Works for 35 locomotives and with the American Locomotive Co. for 25.

The Chicago & North Western has ordered 25 locomotives from the Baldwin Locomotive Works.

The Canadian National Railways distribution of orders appears to be as follows: Canadian Car & Foundry Co., Montreal, 1200 cars, including 100 passenger cars; Eastern Car Co., New Glasgow, N. S., 1200 cars; National Steel Car Co., Hamilton, Ont., 1200 cars; Canadian Locomotive Co., Kingston, 26 locomotives; Montreal Locomotive Works, Montreal, 35 locomotives; Dominion Steel Corporation, Sydney, N. S., 25,000 tons of steel rails; Algoma Steel Corporation, Sault Ste. Marie, Ont., 40,000 tons of steel rails.

Western Pacific is about to close for 20 baggage, 6 dining cars and 20 coaches.

The Union Pacific has placed 21 baggage and mail cars with the Standard Steel Car Co. and is about to close for 10 dining cars. It is also in the market for 8 observation cars.

The Illinois Central has ordered 500 ballast cars from the American Car & Foundry Co.

The Northern Pacific contemplates the purchase of 1000 70-ton gondola cars.

The Kansas City, Oklahoma & Gulf is inquiring for 400 gondola cars and 100 gondola bodies.

The Fruit Growers Express wants 1900 refrigerator cars.

John L. Key, Inc., is inquiring for 300 flat cars.

The Gulf Refining Co., Pittsburgh, is inquiring for 200 flat cars.

The Burlington has let repairs on 200 refrigerator cars to the Streets Co.

The Missouri Pacific has placed 17 steel coaches with the American Car & Foundry Co.

The Chicago & Eastern Illinois has ordered 10 Mikado type engines from the American Locomotive Co.

The Central of Georgia has placed 10 Mikado type engines with the Lima Locomotive Co.

The Grand Trunk has bought 8 switchers from the Lima Locomotive Co.

The Louisville, Henderson & St. Louis has placed 5 Pacific type engines with the American Locomotive Co.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Lake	New York Electrolytic*	Straits Tin New York	Lead New York	Lead St. Louis	Zinc New York	Zinc St. Louis
Jan.	14.87½	14.50	38.62½	7.95	7.75	7.20	6.85
17	14.75	14.37½	38.62½	7.95	7.75	7.20	6.85
18	14.75	14.37½	39.10	7.95	7.75	7.15	6.80
19	14.75	14.37½	....	7.95	7.75	7.15	6.80
20	14.75	14.37½	....	7.95	7.75	7.10	6.75
22	14.87½	14.50	39.37½	7.95	7.75	7.10	6.75
23	14.87½	14.50	40.00	8.25	8.00	7.10	6.75

*Electrolytic quotation; delivered price ¼c. higher.

New York

NEW YORK, Jan. 23.

None of the markets is especially active, but the price tendency in one or two is exceedingly strong. Copper has experienced a slight recession but is again firm. Tin and lead are both scarce for prompt delivery and prices are decidedly higher. The zinc market is quiet and easier.

Copper.—A few sellers the latter part of last week took the moderate amount of business that was offered at a concession from the price which had prevailed recently, so that the market was quotable at 14.62½c., delivered. Since then the market has grown firmer and is again on a basis of 14.75c., delivered. There was also some easing in the prices at which export business was done, but this market has also stiffened. Most of the large producers have not made any concession, however, being well sold up for first quarter of this year. Because of the heavy buying in December and also because of the expectation that the unsettled conditions in Europe might weaken the market, buyers have been conservative and the market has been quiet. Lake copper is quoted at 14.75c. to 15c., delivered.

Tin.—The feature of the market is scarcity of spot Straits and as a result prices have advanced. One steamer having 475 tons is not expected to arrive before Jan. 29, and this is a factor in the quantity of tin available. The market has been only moderately active, with total sales since Jan. 16 of about 800 to 900 tons. On Jan. 17 there were light sales of spot Straits at 38.50c. to 38.75c., with some sellers disposed to sell futures at 38.62½c. to 38.75c., at which levels a little business was done. On the following day there were a few sales of tin afloat in New York, but on Jan. 19 a fair business was transacted in nearby tin at 38.12½c., and in March shipments from the East at 39.50c. The market on Saturday, Jan. 20, was an unusual one for that day, in that a very good business was done, amounting to 200 tons of Straits shipment tin and 300 tons of Chinese and Banca tin. Yesterday 300 tons of spot Straits was sold at 39.37½c., with some February delivery metal at 39.25c. On the whole transactions have centered on January and February metal. Only a small business was done today, with some sales made at 40c., New York, which we quote as the market for spot Straits tin. This is the highest price since October, 1920. An interesting report is that freights on tin from the East to New York have been advanced $3 per ton. Heavy sales are reported in London today with quotations at £183 15s. for spot standard, £185 5s. for both future standard and spot Straits, all about £3 per ton higher than a week ago. Arrivals thus far this month have been 4650 tons, with 7778 tons reported afloat.

Lead.—There has been no halt in the advance in this market and prices are again considerably higher. The leading interest has increased its quotation twice the last week, the last one being announced today, which places its quotation at 8c., New York, as compared with 7.75c., late last week and 7.50c. a week ago. Following recent tendencies the outside market is also higher with sales made today at 8.25c., New York, and with some sellers asking 8.50c. The quotation in the outside market at St. Louis, is 8c. Demand is exceedingly good from all quarters.

Zinc.—The market for prime Western continues the easy tendency which has prevailed recently. Declines in London have been followed by declines in this market and vice versa, so that the bottom has not yet been reached. A fair business is reported but not sufficient to stabilize the market. There is some variation in quotations, prompt metal being quoted at 6.80c., and February or 30-day delivery at 6.75c., St. Louis, and 7.10c., New York, with March held at five points less. An interesting fact is the sale of high grade or brass special for export to France, Belgium and Germany.

Antimony.—The market is strong and wholesale lots of Chinese metal for early delivery are quoted at 6.85c., per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, from foreign producers, is quoted in wholesale lots for early delivery through importers at 22.50c. to 23.50c. per lb., New York, duty paid. Quotations of the leading domestic producer are not made public.

Old Material.—The market is a little off this week and business is quiet. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	14.00
Copper heavy and wire	13.00
Copper, light and bottoms	11.50
Heavy machine composition	11.00
Brass, heavy	9.00
Brass, light	7.25
No. 1 red brass or composition turnings	10.50
No. 1 yellow rod brass turnings	8.00
Lead heavy	6.25
Lead tea	5.00
Zinc	5.00

Chicago

JAN. 23.—The leading lead producer yesterday advanced prices $5 a ton and the general market has gone up sympathetically $4 to $6 a ton. Tin has also advanced, but zinc has declined. Lead buying has been fairly heavy and considerable tin is changing hands, but otherwise the metals are quiet. Among the old metals copper bottom and brass grades have advanced. We quote, in carload lots, lake copper, 15c.; tin, 40.50c. to 41c.; lead, 7.90c. to 8c.; spelter, 6.85c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 12.25c.; copper bottoms, 10.25c.; red brass, 9.50c.; yellow brass, 7.50c.; lead pipe, 6c.; zinc, 4.75c.; pewter, No. 1, 25c.; tin foil, 27c.; block tin, 34c., all buying prices for less than carload lots.

Thropp Business Reorganized

The interests of Joseph E. Thropp, consisting of the Everett and Saxton blast furnaces at Everett and Saxton, Pa., iron ore properties, coal mines and coke ovens, have been incorporated under the laws of Delaware with 30,000 shares of no par value. New capital has been invested and the business, which has been inactive for about two years, will be more aggressively carried on. Joseph E. Thropp has been elected president; Douglas S. Thropp, vice-president; and Andrew S. Webb of Charles J. Webb & Co., Philadelphia, who is engaged in the wool business, has been elected treasurer. The Everett furnace will be put in blast in about two weeks on foundry iron. Pilling & Co., Philadelphia and New York, will continue as selling agents.

Status of Brier Hill Employees

YOUNGSTOWN, Jan. 23.—J. B. Kennedy, chairman of the Board of Directors, Brier Hill Steel Co., today notified department heads in the general offices that employees in these departments, numbering over 100, will continue in their positions until April 1. After that date, they will be subject to such changes as the Youngstown Sheet & Tube Co., purchaser of the company, may direct.

Mr. Kennedy has accepted presidency of the Ohio-Kentucky Fluorspar & Lead Corporation, a $1,000,000 corporation operating mines at Smithland, Livingston County, Ky.

PERSONAL

HENRY T. CHANDLER

J. Leonard Replogle, president Vanadium Corporation of America, announces that Henry T. Chandler has become associated with the company as metallurgical engineer with headquarters in Detroit. Mr. Chandler was formerly associated with C. Harold Wills in C. H. Wills & Co. as metallurgical engineer, and before that was research engineer for the Ford Motor Co. Before entering the industrial world, he received his technical training at the University of California and Massachusetts Institute of Techonology, later completing his education abroad at the Sorbonne in Paris and at Zurich Polytechnic Institute in Switzerland. During his connection with the Ford Motor Co. as research engineer, exhaustive experiments in iron and steel were made, in the course of which all the elements that enter into the composition of alloy steels were thoroughly investigated. These efforts were directed toward the development of the best grade of alloy steel adaptable to automotive requirements. During the war Mr. Chandler was largely instrumental in the development of new alloy steel for army vehicles, light armor plate, tanks, turbines, Eagle boats and Liberty motors. Mr. Chandler will be associated in the Detroit office of the Vanadium corporation with Walter R. Flannery, manager of sales of the western division of the company. George L. Norris, chief metallurgical engineer of the corporation, will continue to have his headquarters in the New York office at 120 Broadway.

Joseph A. Boucher has been appointed sales manager of the Gifford-Wood Co., elevating and conveying machinery, Hudson, N. Y. He has been with the company for more than 15 years, much of his early training having been given to engineering.

Martin J. Luther, formerly sales representative Warner & Swasey Co. at Milwaukee, Wis., has been appointed Chicago district sales representative of the Foster Machine Co., Elkhart, Ind.

E. H. Morgan, president Arcade Mfg. Co., manufacturer of molding machines, Freeport, Ill., is leaving this month for California, where he will spend the winter.

A. O. Sonne, resident manager of the Chicago office of Rogers, Brown & Co. for a number of years, has left the employ of the firm.

Howard W. Dunbar has been made assistant to William La Coste Neilson, general sales manager and vice-president of the Norton Co., Worcester, Mass. Mr. Dunbar was sales manager of the company's machine division. Wallace T. Montague has been appointed to fill that office, and H. L. Griffin becomes assistant sales manager of the machine division to fill Mr. Montague's place. H. B. Lindsey has been appointed sales engineer of that division. The Norton Co. at its annual meeting re-elected its board of officers as follows: President, Charles L. Allen; chairman of the board of directors, George I. Alden; secretary and works manager, George N. Jeppson; treasurer, Aldus C. Higgins; directors, these officers and R. Sanford Riley, Henry Duckworth and William L. Neilson. Mr. Neilson will sail early in February for a two months' business trip to Europe for the company.

A. W. Copeland, president Detroit Gear & Machine Co., has been elected by the executive committee of the American Gear Manufacturers' Association to fill the vacancy on that committee caused by the death of John B. Foote.

DeWitt E. Yates, Eau Claire, Wis., has become associated with the American Steam Pump Co., Battle Creek, Mich., as consulting and designing engineer. He formerly was head of the Northlite Mfg. Co., Eau Claire, manufacturer of pumps under patents issued to him. This concern recently retired from business and disposed of its patents and considerable of its special equipment to the pump company.

George H. Grundy, formerly general sales manager of the Polidi Steel Corporation of America, 115 Broadway, New York, has severed that connection and has been succeeded by Reginald Wilson.

G. A. Grewer has returned to the sales department of the Alan Wood Iron & Steel Co., Philadelphia, with which he was previously associated. For the past year Mr. Grewer has been connected with the sales department in the Eastern territory of the Eddystone Steel Co.

Ivar L. Sjostrom, president Manufacturers Machine Co., North Andover, Mass., recently sailed for England and France to be gone about three months on business.

Renshaw Borie has been appointed manager in charge of the Philadelphia territory for McClellan & Junkersfeld, Inc., New York, with offices in the Otis Building, Philadelphia. He was formerly vice-president of the U. S. Hoffman Machinery Co., Syracuse, N. Y. McClellan & Junkersfeld, Inc., are construction engineers who have handled some noteworthy engineering operations.

Joseph Francis Gleason, who has been associated with Montgomery & Co., Inc., 105 Fulton Street, New York, for forty years, has been elected president of the company.

Hamilton Stewart, vice-president Harbison-Walker Refractories Co., Pittsburgh, was elected recently to the directorate of the Union National Bank, Pittsburgh. He is also a director of the Crucible Steel Co. of America, the Pittsburgh Crucible Steel Co. and the Koppers Co.

L. V. Walsh, for about 20 years treasurer and general manager of sales of the Pittsburgh Shovel Co., has resigned. He has made no definite plans for the future. C. B. Steffey, secretary of the company since 1917, will assume the duties of sales manager in addition to those of secretary.

George S. Davison, Pittsburgh, recently elected first vice-president of the American Society of Civil Engineers, is president of the Allen S. Davison Co., also owner and operator of the Sharpsville Furnace Co., Sharpsville, Pa., and of the Basic Products Co.

Homer L. Rank has been appointed sales manager of the coal pulverizing equipment department of the Bonnot Co., Canton, Ohio.

A. F. Reade, recently with the Atlas Crucible Steel Co., Dunkirk, N. Y., has been elected treasurer of the Bishop & Babcock Co., Cleveland, succeeding Joseph H. Champ, who has resigned but will remain on the board of directors.

H. G. Smith has been appointed vice-president in charge of sales of the Bethlehem Shipbuilding Corporation, Ltd., with offices at 25 Broadway, New York.

L. L. Munn, vice-president and general manager Arcade Mfg. Co., manufacturer of molding machines, Freeport, Ill., sailed from New York Jan. 20, on the Empress of Britain for a month's cruise in the West Indies.

William H. Vasel has been appointed purchasing agent for the Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill., with which he has been associated for 18 years.

The Matlack Coal & Iron Co., Inc., New York, an-

nounces that Arthur H. Nelson has been appointed line agent in northern New Jersey territory. At the annual meeting of the stockholders of the company, the following officers were re-elected: Howard C. Matlack, president; A. F. Kempe, vice-president; G. Walter Bates, secretary and treasurer. Sinclair Carr, of Mann, Macneal & Co., Ltd., who are London agents of the company, is now in the States and is making his headquarters at the office of the company, 44 Beaver Street.

W. E. Wallace has been appointed manager of the coal sales department of the firm of Park & Williams, Real Estate Trust Building, Philadelphia, pig iron, coke and coal.

Lewis J. Firth, president, Firth-Sterling Steel Co., Pittsburgh, has returned to the United States after several months' absence. He arrived in New York Jan. 22, and will make his headquarters at the works in McKeesport, Pa., and in Pittsburgh, for several months.

Marvin E. Monk has been made director of sales for the U. S. Ball Bearing Mfg. Co., Chicago.

Albert W. Honywill, Jr., has severed his connection with the Terry Steam Turbine Co., Hartford, Conn., to become assistant to the president of the Diamond Power Specialty Corporation, Detroit.

J. D. Waddell was reelected president of the Mahoning Valley Steel Co. at the annual meeting held on Jan. 17. John Hosack was chosen vice-president; W. Aubrey Thomas, secretary; and W. A. Jones, assistant secretary. Directors were relected. The company operates an eight-mill sheet plant at Niles, Ohio.

Edwin L. King has been appointed district sales manager of the Reading Steel Casting Co., Inc., with headquarters in Chicago.

W. B. Jones, formerly resident engineer for the Robins Conveying Belt Co., is now district manager of the Lyon Metallic Mfg. Co., Boston.

Henry A. Lardner, vice-president J. G. White Engineering Corporation, New York, has been elected chairman of the library board of the United Engineering Societies for 1923.

Alfred K. Barker, for the last three years president of the Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., has resigned and disposed of his holdings in the company. He purposes to devote the next few years to his large fruit farms located in Lower Westchester County, New York, in the vicinity of Ossining.

Charles F. Hauss, Far Eastern representative of the American Radiator Co., at Shanghai, China, who has been in this country for a number of weeks, is scheduled to leave New York on Feb. 1 to return to Shanghai.

Ludolph Oscar Koven, head of the firm of L. O. Koven & Brother, which owns and operates machine and tank building shops in Jersey City, N. J., was recently presented with a bronze figure in recognition of 27 years' service as officer and director of the Manufacturers' and Dealers' Protective Association. The presentation was a surprise and was made to Mr. Koven at a luncheon meeting of the organization. William M. Seymour, Graff Furnace Co., New York, president of the association, pointed out that Mr. Koven was a charter member of the organization and had been treasurer since 1895. The statute shows a metal worker bent over his work and is designed to portray, "the source of wealth."

Frederick A. Halsey, New York, will be awarded the A. S. M. E. medal for 1922 if the recommendations of the committee on awards and prizes of the American Society of Mechanical Engineers are accepted. The award is made on a paper by Mr. Halsey describing the premium system of wage payments presented before the society at the Providence meeting in 1891. "The adoption of the methods proposed," says the committee, "have had a most profound effect toward harmonizing the relations of worker and employer."

Ralph W. Clark, resident New York manager of the pig iron department of Pilling & Co., Philadelphia, and Frank J. Herman, resident New York manager of the coal department, have been chosen directors of the company.

OBITUARY

GEORGE H. HULETT, Cleveland, who won wide prominence in the engineering field by designing heavy equipment for handling coal and ore, died at Daytona, Fla., on Jan. 17, aged 76 years. In his field he was regarded as a prolific inventive genius. Doubtless his most distinguishing engineering achievement was in the invention of the ore unloading machine bearing his name.

G. H. HULETT

Ore unloading equipment was being used that handled a small load at high speed, and he conceived the idea of developing a machine that would handle a large load at slow speed. The first unloader of the Hulett type was erected for the Carnegie Steel Co., Conneaut, Ohio. This had a 10-ton bucket and was hydraulically operated. Many of the Hulett type machines have since been installed at Lake Erie ports, and these have contributed greatly to reducing the cost of handling ore and to the speed of unloading boats. He was also one of the developers of the lifting type of car dumper now generally used, and he designed various improvements in conveying bridges for handling ore and other material. Mr. Hulett was born in Conneaut, Ohio. In 1890 he became engaged in the manufacture of coal and ore handling machinery in Cleveland. In 1898 he became associated with the Variety Iron Works, Cleveland, as engineer of construction, and in 1903 he became an engineer of the present McMyler Interstate Co. and developed the Hulett unloading machine while with this company. In 1907 he became connected with the Webster, Camp & Lane Co., Akron, which shortly afterward was consolidated with the Wellman-Seaver-Morgan Co., Cleveland. He was vice-president and director of this company with which he remained until 1918. Then he became associated with his son, Frank E. Hulett, who organized the Hulett Engineering Co. and was its vice-president. He was a member of the American Society of Mechanical Engineers and of the Cleveland Engineering Co.

J. H. HENRY, who had been connected for more than 35 years with the New York office of the Carnegie Steel Co., died suddenly on Monday, Jan. 8, aged 65 years. Mr. Henry had to do largely with the structural steel department of the Carnegie office, and had close contact with building and contracting. He was widely known in the iron and steel trade of the East.

H. H. SUYDAM, president Cincinnati Mfg. Co. and Cincinnati Fly Screen Co., Cincinnati, died at his home in that city on Jan. 15, after a short illness. Mr. Suydam was very well known in the iron and steel trade and was one of the leading citizens of the city, having been interested in many financial enterprises. He was also prominent in educational and artistic activities.

FRANKLIN T. SMITH, treasurer Marvel Clutch Co., Milwaukee, manufacturer of transmission devices, died on Jan. 14 at the age of 58 years. He was a graduate of the University of Munich, Germany, and Harvard University.

Due to inability of the Pennsylvania Railroad to move coal and coke, two blast furnaces in the Ohio works group of the Carnegie Steel Co. at Youngstown were forced to suspend over the week end, but have resumed. Considerable embarrassment has been caused furnace and steel works interest because of traffic difficulties.

British Iron and Steel Market

Prices Harder—Fuel and Other Costs Rising—Ruhr Events Confuse Continental Markets—Tin Plate Up

(By Cable)

LONDON, ENGLAND, Jan. 23.

Phenomenal demands for fuel are forcing up iron and steel prices.

Pig iron is strong on increasing home and export demand. Cleveland makers are fully booked and contemplating increasing their output [by putting more furnaces in blast]. America and Canada are inquiring for Scotch foundry iron. No. 3 Cleveland is quoted up to £5 ($23.30) f.o.b., for February shipment. Hematite is active but sellers are cautious. Italy has made fair purchases and prices are advancing.

There is an upward tendency in prices for finished iron and steel, on increasing costs and home demand for all kinds. Good lines of plates have been placed. Australia and India are purchasing moderately, but export buyers generally are disinclined to commit themselves to forward transactions.

Continental markets are confused by the Ruhr occupation, and many quotations have been withdrawn. Demand continues strong, especially from India and the Far East. German 8-gage wire rods are being sold at £8 ($37.28) f.o.b. German light and heavy rails and accessories are now quoted at £6 15s. ($31.45) f.o.b. Belgian merchant bars have been sold at £7 (1.46c. per lb.) f.o.b.

As tin plate bars have been advanced 7s. 3d. ($1.69), the minimum agreed price of tin plate is now 20½s. ($4.78) basis, f.o.b. Most works, however, are quoting 21s. ($4.89) and few merchant sellers below 20¾s. ($4.84). There is good demand, especially from the home trade.

Large demand exists for galvanized sheets, from all parts except Japan. The works are fully booked and prices are advancing on increasing costs.

Black sheets are firm, with a further upward tendency. The Far Eastern business is increasing, in both thick and thin specifications. The works are quoting for March to April shipment.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.66 per £1, as follows:

Durham coke, delivered	£1	11s.	to	£1	11½s.	$7.22	to	$7.36
Cleveland No. 1 foundry	4	17½				22.72		
Cleveland No. 3 foundry	4	15	&	4	16*	22.14	&	22.37*
Cleveland No. 4 foundry	4	7½				20.39		
Cleveland No. 4 forge	4	2½				19.22		
Cleveland basic	4	5				19.81		
East Coast mixed	4	15				22.14		
Ferromanganese	15	0				69.90		
Ferromanganese*	14	0				65.24		
Rails, 60 lb. and up	8	0	to	8	5	37.28	to	38.45
Billets	7	0	to	7	5	32.62	to	33.79
Sheet and tin plate bars, Welsh	7	13¾	to	8	1	35.82	to	37.51
Tin plates, base box	1	0¾	to	1	1	4.83	to	4.89
						C. per Lb.		
Ship plates	8	12½	to	9	0	1.79	to	1.87
Boiler plates	11	0	to	11	10	2.29	to	2.39
Tees	9	2½	to	9	10	1.90	to	1.98
Channels	8	7½	to	8	15	1.74	to	1.82
Beams	8	5	to	8	10	1.72	to	1.77
Round bars, ¾ to 3 in.	9	5	to	9	15	1.92	to	2.03
Galvanized sheets, 24 g.	18	10	to	19	0	3.85	to	3.95
Black sheets, 24 gage	12	10				2.60		
Black sheets, Japanese specifications	15	5				3.17		
Steel hoops	11	0	&	11	10*	2.29	&	2.39*
Cold rolled steel strip, 20 g.	22	2½				4.60		
Cotton ties, Indian specifications	15	0				3.12		

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:								
Belgium, Feb., Mar.	£4	2½s.	to	£4	5s.	$19.22	to	$19.81
Luxemb'g, Feb., Mar.	4	2½	to	4	5	19.22	to	19.81
France, Feb., Mar.	4	2½	to	4	5	19.22	to	19.81
Billets:								
Belgium, not quoted.								
France, not quoted.								
Luxemburg, not quoted.								
Wire rods, 5 mm. (0.2 in.):								
Belgium	7	5	to	10	7½	33.79	to	48.35
Wire nails (keg basis):								
Germany	0	14½				3.38		
Belgium	0	20½				4.78		
Angles:						C. per Lb.		
Belgium	7	7½				1.54		
Tees:								
Belgium	8	5				1.72		
Merchant bars:								
Belgium, Mar., Apr.	6	15				1.40		
Luxemburg, not quoted.								
France, not quoted.								
Germany, not quoted.								
Joists (beams):								
Belgium, Feb., Mar.	6	2½	upward			1.26		
Germany, not quoted.								
Channels:								
Belgium	7	10	to	7	12½	1.56	to	1.59
¼-in. plates:								
Germany, Mar., Apr.	6	5				1.30		
Belgium, not quoted.								
Luxemburg, not quoted.								
France, not quoted.								
No. 8 gage wire:								
Belgium	14	10¾				3.02		

GERMAN STEEL PRICES HIGHER

Advances in Marks Average 24 Per Cent—Foundry Iron Not Immediately Affected

(By Radiogram)

BERLIN, GERMANY, Jan. 23.—Foundry iron No. 1 remains at 194,900 m. per metric ton ($9.90 per gross ton, at ½c. per 100 m., compared with $14.45 last week, at 0.73c. per 100 m.).

Steel ingots have been advanced to 293,900 m. ($14.93), compared with 240,800 m. ($17.85) last week. Steel bars have been raised to 406,000 m. (0.92c. per lb.) compared with 328,000 m. (1.09c. per lb.) and thin steel sheets to 632,900 m. (1.44c. per lb.) compared with 497,000 m. (1.65c. per lb.).

Scrap Strong in Canada

TORONTO, Jan. 23.—Trading in iron and steel scrap is on a stronger footing than a month ago. Buying on foundry accounts indicate that these are fairly busy, and their requirements of machinery cast are steadily mounting. Foundries that are equipped for the production of castings and various lines of automobile parts have a decided advantage over other concerns, and those with contracts on hand are operating very near the capacity mark. The additional strength reported in the price of pig iron is expected to have a stimulating effect on prices dealers are offering for scrap, and as a result scrap interests look for an upward revision in dealers' buying prices, which at present are quoted as follows:

Dealers' Buying Prices

Gross Tons

Steel axles	$16.00
Axles, wrought iron	16.00
Car wheels, iron	16.00
Heavy melting steel	11.00
Rails	11.00
No. 1 wrought scrap	11.00
Steel turnings	9.00
Cast borings	7.00
Wrought pipe	6.00
Machine shop turnings	6.00
Heavy axle turnings	6.00

Net Tons

No. 1 machinery cast	18.00
Stove plate	14.00
Standard car wheels	14.00
Malleable scrap	10.00

Philadelphia Iron Men to Give Dinner

The Iron Mongers' Association, Tubal Cain Chapter of Philadelphia, a social organization of pig iron men of the eastern Pennsylvania district, will have its first annual dinner and entertainment Friday evening, Feb. 9, at one of the Philadelphia hotels. The guest of honor will be M. B. Meanley, president Jones Hollow Ware Co., Baltimore, who has presented the association, a golf cup cast in iron. Robert C. Lea is head iron monger and George P. Pilling is clerk of the association.

BOOK REVIEWS

The Blast Furnace and the Manufacture of Pig Iron. By Robert Forsythe; completely revised by Carl A. Meissner and J. A. Mohr. Pages 371, 6 x 9 in.; illustrations 74. Published by U. P. C. Book Co., 239 West Thirty-ninth Street, New York. Price, $4.

The appearance of a new edition of "Blast Furnace and the Manufacture of Pig Iron," by Robert Forsythe, is a welcome addition to the literature of the subject, particularly as the revisers, Carl A. Meissner and J. A. Mohr, occupy a unique position in the metallurgical field covered by the volume. Doctor Forsythe's work, planned as it was to make plain to the student and furnaceman the basic principles and the well-known and generally accepted practices of the metallurgical art, avoided controversial constructions and practices, fads, and numerous widely exploited improvements which the lapse of time has shown to be in general unjustified. The revisers have wisely adhered to Doctor Forsythe's original plan to include nothing which has not had previous publication and acceptance by the industry, although the references to original sources in the margin of the earliest editions have been deleted and substantial increases covering accepted developments of practice have been introduced.

The new matter includes such subjects as Ferro-Alloys, Foreign Ores, Sintering, By-Product Ovens, Dust Catchers, Cleaners, Furnace Tops, Stoves, Equalizers, Turbo-Blowers, Gas Engines, and the Electric Steel Process. Ore and coke statistics have been brought up to date, but the statistics of pig iron production are not given in either edition. There are numerous minor additions to the text, and a number of additional illustrations, both half tone and line, add greatly to the value of the volume.

The "lines of a modern blast furnace," Fig. 54, show in some measure the growth of the art in the 15 years between the editions. The hearth is now 20 ft. 9 in. in diameter by 11 ft. 9 in. high, instead of 14 ft. in diameter by 8 ft. high; bosh 23 ft. in diameter, as against 21 ft., and the furnace height 93 ft. 11 in. instead of 80 ft. The changes in general furnace arrangements are well shown by Fig. 53 in comparison with the section of the old Eliza furnace in the original edition. Three new illustrations, the frontispiece and Figs. 10 and 11, are historical in character, showing the early furnace constructions in the Pennsylvania field, and it is to be regretted that the revisers did not go further and add a historical sheet of furnace lines, which, perhaps better than anything else, gives the student an understanding of present-day developments.

By a curious slip on page 321 the author confuses "semi-steel" and "gun iron." Gun iron is pig iron remelted and refined in the reverberatory hearth and was made long before steel was in common use. No steel scrap was used in its manufacture, but the charge was rabbled more or less and it is possible some of the cast iron may have "come to nature" in the charge. Analyses of good grades of gun iron (Civil War columbiads) do not show this, however. Later it was found that additions of steel scrap up to 30 per cent could be made to the charge, but the quality of the iron was not greatly improved. The characteristics of gun iron are low silicon content with good machining qualities and a much higher tensile strength than usual.

Semi-steel may be made by the addition of steel turnings to the molten cast iron in the ladle, but it is usually made in the cupola by the addition of steel scrap to the pig iron charge. The steel is intended to act as a decarburizer and any proportion up to 100 per cent steel may be used. In the product the silicon content is not usually reduced, the carbon content is extremely uncertain, due to varied absorption from the fuel, and the material is not homogeneous.

The technical descriptions of burdening, slagging, operation and furnace irregularities and their correction are little changed in the new edition. They cover the field of furnace practice in sufficient detail for practical use and are clear and understandable. The chapters on Uses of Pig Iron and Chemistry and Physics are practically untouched.

Those of us who knew Doctor Forsythe in his boyhood and early manhood recognize in the volume the broad view and conscientious seriousness of the man. Although conservative by ancestry and training, his facile and orderly mind chose, classified and arranged the living principles of blast furnace practice of 1907 with such skill that the bulk of his work is still current in 1922. His revisers, whose authority in the blast furnace and pig iron field is second to none, have agreed with him and as a result the book stands for students and furnace operators a model of its kind, brought up to date and giving in reasonable compass the basic principles necessary to a clear understanding of the machinery and methods of the manufacture of pig iron.

GEORGE A. ORROK.

Spiral Riveted Pressure Pipe

What amounts to almost a treatise on the subject of spiral riveted pressure pipe has been issued by the American Spiral Pipe Works of Chicago in the form of an 80-page booklet, 8 x 10¼ in., in size, profusely illustrated and carrying a large amount of information with regard to capacities and uses. The subjects of the flow of water, measurement of that flow and the calculation of horsepower are given attention, not only as related to flow in pipes but also through nozzles. While the publication is essentially a catalog, it contains an unusual quantity of information along the line of its particular product. Several of the diagrams are in facsimile blueprint.

New Books Received

Fraser's Directory of Metal Products, 1923. Pages 350, 9 x 6½ in.; illustrated. Published by the Fraser Publishing Co., 128 Bleury Street, Montreal. Price, $3.

Mechanical World Year Book, 1923. Pages 215, 3¾ x 6¼ in.; illustrated. Published by Emmott & Co., Ltd., 65 King Street, Manchester, England. Price, 1/6.

Cost Accounting Procedure. By William B. Castenholz. Pages 333, 6 x 9½ in.; numerous charts. Published by La Salle University Press, Michigan Avenue at Forty-first Street, Chicago. Price, $3.50.

Metallography and Macrography. By Leon Guillet and Albert Portevin. Pages 289, 6 x 9 in.; illustrations, 562. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $6.

The Working of Steel. Annealing, Heat Treating, etc. By Fred H. Colvin and K. A. Juthe. Pages 245, 6 x 9 in.; illustrations, 135. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $3.

Interstate Commerce Commission. Annual report for year ended Oct. 31, 1922. Pages 239, 5¾ x 9 in. Published by Government Printing Office, Washington.

The Fundamental Principles of Purchasing. By H. D. Murphy. Pages 83, 4½ x 7¼ in. Published by the Purchasing Agent Co., Inc., 19 Park Place, New York. Price, $1.50.

General specifications for electric overhead traveling cranes for heavy duty steel mill service, recommended by the crane standardization committee of the Association of Iron and Steel Electrical Engineers, are available in pamphlet form and can undoubtedly be had by applying to the association at 1007 Empire Building, Pittsburgh. F. W. Cramer, engineer of tests, Cambria Steel Co., Johnstown, Pa., was chairman of the committee, and the subject was presented at the convention of the association in September, 1921.

A bulletin on chemical engineering, illustrating the resources it has for teaching the subject, has been prepared for distribution by the Rensselaer Polytechnic Institute, Troy, N. Y. The chemical engineer is described as a professional man experienced in the design, construction and operation of plants in which materials undergo chemical or physical change.

Alloy Steel for Structural Purposes

(*Continued from page* 281)

steel or chrome-nickel steel. The specifications for plates and shapes up to and including 1 in. thick are as follows:

	Carbon Steel	Nickel Steel	Chrome-Nickel Steel
Min. T. S., lb. per sq. in....	62 to 70,000	85 to 100,000	85 to 100,000
Min. yield point, lb. per sq. in..	35,000	50,000	50,000
Elongation in 8 in., per cent..	1,500,000 T. S.	1,600,000 T. S.	1,600,000 T. S.
Min. reduction of area, per cent	44	40	30

Nickel Structural Steels

Considering first the use of nickel in structural steels, the properties of 3.5 per cent nickel steel have been generally recognized for some 15 years or more, the manufacturing conditions and costs are well established and there are in existence widely accepted specifications as A. S. T. M., A8-21 (see the table). This material also has been advocated several times before this society, especially by Mr. Waddell. There is allowed up to 0.45 per cent carbon in this steel which has a yield point (50,000 lb. per sq. in.) nearly double that of low carbon structural steel, but with slightly less ductility.

This material was first used in bridge construction about 1904 in the Blackwell's Island Bridge, designed by Mr. Lindenthal. Mr. Waddell has advocated insisting on 55,000 or even 60,000 lb. per sq. in. yield point for this grade of steel, but it should be borne in mind that, if the chemical composition is kept constant, yield point can be raised only by thermal or mechanical treatment (as by cold working it), a procedure which tends to make for lack of uniformity of properties. This implies a best value for the finishing temperature of rolling any given section of a material. It may be that 50,000 lb. per sq. in. yield point is too low for this material, but then the specified tensile strength and ductility are probably also low. This material as used in the construction of the St. Louis Bridge,* for annealed specimens averaged 99,850 ultimate, 60,250 yield point, 17.9 per cent elongation in 8 in. and 53.3 per cent reduction in area, with a chemical composition of C. = 0.38, Mn. = 0.58, Ni. = 3.45, P. = 0.012, S. = 0.03 per cent.

In the Manhattan Bridge about 8000 tons of plates and shapes of nickel steel were used and nickel steel rivets as well. The requirements were tensile strength 85 to 95,000, yield point 55,000, elongation in 8 in. 1,600,000/T. S. per cent. Nickel steel has also been used in the following bridges, the new Quebec, Frott in Kansas City, Jacknife of Chicago, and the Detroit-Superior High Level Bridge at Cleveland.

Copper in Structural Steel

The element that best may be compared with nickel for addition to structural steel is copper, which has been shown to increase the strength, yield point, and resistance to shock and to atmospheric corrosion, without loss of ductility. A series of experiments have definitely disproved the erroneously held idea of embrittlement of low and medium carbon steel by copper.† A steel containing 0.38 per cent carbon, 0.57 per cent manganese and 0.86 per cent copper will have a yield point close to that of 3.5 per cent nickel steel with considerably greater ductility. In the tests of Hayward and Johnston the elongation in 2 in. was 27.3 per cent and the reduction in area 52.7 per cent as compared with the requirements of nickel steel of 16 and 25 per cent respectively, in A8-21 of the table.

Clevenger and Ray‡ have noted the tendency of copper to segregate toward the bottom of small ingots when over 0.8 per cent is added as metallic copper. The relatively low cost of copper and the ease with which it may be added to structural steel indicate that it should be recommended, at least after trial in some large heats on full size structural members. In fact, this appears to be a most promising field of research from the points of view of engineering, metallurgy and economy, and it would probably be more than worth while to carry out an investigation to determine the best metallurgical practice, manufacturing costs, and most suitable limits for copper, either alone or with other elements, such as nickel and manganese, in structural steel, similar to that reported by Mr. Waddell* for nickel steels.

It may be recalled that some American iron ores carry copper which goes into and remains in the steel, which often contains 0.25 per cent copper, to its improvement. It is possible there might be advantage in using either the copper-nickel ore from which Monel metal is made, for example, or some intermediate product or even Monel metal itself (68 per cent Ni., 28 per cent Cu., residual mainly Fe. and Mn.) in producing an economical copper-nickel structural steel.

Vanadium and Chrome-Nickel Steels

The case for vanadium as an alloying element has been attractively stated by G. L. Norris,† although as Mr. Waddell pointed out, this exhibit was not without ambiguity either from the metallurgical or cost point of view. The advantages of vanadium appear to be greatest in association with chromium for steels to be heat-treated.

An interesting possibility is the greater development of nickel-chromium structural steels using such ores as the Mayari as a base. Large steel columns made from this steel containing 1.12 to 1.58 per cent nickel and 0.37 to 0.66 per cent chromium were tested at the Bureau of Standards for the Metropolis and Memphis bridges (B. S. Technologic Paper 184). Some of these steels also had a copper content up to 0.1 per cent. Credit is due to Mr. Modjeskie for the first use of Mayari steel in bridge construction, namely for the Memphis Bridge. A large number of smaller railroad bridges have since been constructed in which Mayari steel has been used.

Silicon Steel for Bridges

Another alloy steel that is coming into use for structures, such as parts of the Delaware Bridge, is the so-called silicon steel (see table) which might perhaps be as well named a silicon-manganese steel, as the specifications call for maximum C., 0.40; Si., 0.45; Mn., 1 per cent, with a minimum of Si. of 0.20 per cent. The raising of the elastic limit by increase of silicon seems to be of English origin. The Sandbergs urged the use of 0.3 to 0.4 per cent silicon in rail steel some 20 years ago. Silicon steel appears to have been first produced in America by the Cambria and Carnegie Steel companies in the form of plates and shapes for light torpedo-boat destroyers about 1908 or 1910, for which the Navy Department desired a steel of 80 to 90,000 lb. per sq. in. tensile strength and a steel carrying approximately 0.75 per cent Si., 0.60 to 0.80 per cent Mn., and 0.30 to 0.40 per cent C. was produced for that purpose. The Carnegie Steel Co., I understand, in 1912 made the first proposal of a silicon steel for bridge construction, for the eye-bars and structural steel of the Memphis Bridge.

Here is again a case in which a so-called impurity, silicon, has become a desirable and relatively cheap alloying element, imparting strength and high elastic limit to the steel. The present specification, however, is really a double one, permitting the physical properties desired (see table) to be attained by either high silicon or high manganese. The manufacturers will naturally furnish a steel of an adjusted composition, depending on the relative price of ferrosilicon and ferromanganese. Steel of this type was also tested at the Bureau of Standards in the form of large columns for

---

* J. A. L. Waddell—Bridge Engineering, p. 91, Wiley & Sons, 1916.

†For example, see paper by Hayward and Johnston, Am. Inst. Min. & Met. Engrs., LVIII, p. 722, 1918, and references therein.

‡Clevenger and Ray: The Influence of Copper upon the Physical Properties of Steel. Bull. Am. Inst. Min. Engrs., No. 82, pp. 2437-75; 1914.

*J. A. L. Waddell: Nickel Steel for Bridges, Proc. Am. Soc. Civil Engrs., LXIII, p. 101; 1909.

†Trans. Am. Soc. Civil Engrs., LXXVIII, p. 72; 1915 in discussion of Mr. Waddell's paper on High Alloy Steels for Bridges.

the Metropolis Bridge (B. S. Technologic Paper No. 184). The Bureau is now making additional tests of this steel made up into fabricated parts for the Delaware Bridge.

Rôle of Titanium

The rôle of titanium has been well described by Mr. Petinot* to be primarily that of a deoxidizer and scavenger and an effective agent for reducing segregation. It is usually added with the ladle additions in the form of ferro-carbon-titanium containing 16 per cent Ti., about 8 to 12 lb. of the alloy to ton of steel (0.06 to 0.08 per cent Ti.), and there remains in the steel less than 0.02 per cent Ti.

The Bureau is just completing an investigation of the manufacture and properties of two 1000-ton lots of rail steel (0.75 C. and Mn. 0.76 per cent) treated with titanium as compared with similar steel deoxidized with ferrosilicon. The mechanical properties of these two steels are not markedly different, but the titanium treated steel has less segregation in the upper part of the ingot and shows a slightly greater tendency toward piping. One would expect still less difference for low and medium carbon steels.

Greater Purification

With regard to the possibilities of improving the physical properties of ordinary structural steel—yield point and ductility—by endeavoring to produce steel more highly "purified," it is questionable if much is to be gained by this means. A series of experiments just completed at the Bureau (B. S. Tech. Paper No. 453) on the mechanical properties of pure alloys of iron, carbon and manganese, containing no phosphorus, with sulphur and silicon less than 0.01 per cent for most of the samples, show that, although there is a slight improvement in ductility, there is a corresponding decrease in strength and elastic limit as compared with commercial steels of same carbon and manganese contents.

In view of the almost negligible importance of the phenomena of fatigue for most structural steels of interest to the civil engineer, the question of further freeing the steel from entrained inclusions, although it may be said to be desirable, yet appears not to be vitally essential, and probably would not allow raising the permissible stresses while the cost would be increased. Structural steel is much less subject to abuse in service than is rail steel, for example, and the manufacturing practices permitted by the specifications for the latter do not necessarily result in clean steel. This should not be taken as an argument for dirty steel, but it must always be borne in mind that for any engineering material there is a most economical procedure in manufacture to meet the engineering requirements.

Heat-Treated Steels

There are evidently possible uses of heat-treated steels in engineering structures, and such steels have been introduced to a limited extent as in lattices and auxiliary parts. The difficulties of furnishing a reliable and uniform product mount rapidly with the size of heat-treated pieces, as do the difficulties and costs of joining by rivets or otherwise. The line of least resistance would seem to be for certain structural purposes, as parts of bridges, to develop first higher carbon steels which may be air quenched by some method such as the Sandberg process. After a study has been made of the most economical alloying element or combination to give maximum yield point without serious loss of ductility in steel to be air treated, it may be possible to consider going over to liquid quenched and tempered steels, although at first at least these should be limited to small parts.

After writing the above paragraph, I learn that Mr. Modjeskie is again a pioneer, for he also appears to be the first to use heat-treated eye-bars for bridges, again for the Memphis Bridge, using Mayari steel for which the rather mild treatment consisted in an anneal at about 1500 deg. Fahr., followed by an air quench. These heat-treated eye-bars, as specified by Mr. Modjeskie, and as furnished by the Pennsylvania Steel Co., had the following properties:

	Specified	Furnished
Minimum tensile strength, lb. per sq. in..	80,000	90,000
Minimum elastic limit, lb. per sq. in.....	47,000	56,000
Minimum elongation, per cent.....	10	13

This composition was approximately C. = 0.35, Mn. = 0.70, Ni. = 1.40 and Cr. = 0.45 per cent.

It is questionable if it will be found economical or safe to push very far the use of severely heat-treated alloy steels for the main members of engineering structures, and at present there are few manufacturing concerns equipped, or with adequate experience, to handle such production. In parts of structures subject to fire hazard, the use of heat-treated steels would be an additional hazard, as, in general, they lose their enhanced properties with rise of temperature.

*Discussion p. 50 of Mr. Waddell's paper on High Alloy Steels for Bridges, *Trans.* Am. Soc. Civil Engrs., LXXVIII, p. 101; 1915.

Shipping Board Surplus Materials Finally Sold

WASHINGTON, Jan. 23.—Announcement has been made by the Emergency Fleet Corporation that the surplus materials, supplies and equipment left from the Shipping Board's war program have finally been sold. The Material Sales Division, which had charge of this liquidation, has been discontinued and the personnel, which is now no longer required for the Shipping Board's work, has returned to private life. This division was organized in September, 1921, to take over the custody and to dispose of all this surplus. Soon after the present board was appointed, an inventory of the surplus materials remaining on hand was taken by Lybrand, Ross Brothers & Montgomery, and it was on completion of this inventory that the actual sales program was undertaken. Some idea of the work involved may be gained from the fact that the Hog Island yard inventory alone comprised 11,000 typewritten pages.

This surplus consisted of a wide range of supplies and equipment such as are used in shipbuilding. There were large quantities of marine engines and boilers, pumps, winches, lumber, steel, pipe, valves and fittings, office materials, plant equipment, etc.

Bureau Will Continue in New York

WASHINGTON, Jan. 23.—The Division of Customs Statistics, taken over from the Treasury Department by the Department of Commerce under a recent law, will not be consolidated with the Bureau of Foreign and Domestic Commerce in Washington. Instead it will be continued in New York. This determination has been arrived at as a result of an investigation ordered by Secretary of Commerce Hoover through a committee including Director Klein of the Bureau of Foreign and Domestic Commerce, and Director Steuart of the Bureau of Census, and others. It was the opinion of the committee that the consolidation would not result in economy or in expediting the work of compiling export and import figures.

The Weirton Steel Co., Weirton, W. Va., has placed all the large piping for the new 10-in. sheet mill and all the piping in connection with its new improvements at the plant with B. Floersheim & Co., Pittsburgh, Pa. The additions will be a new sheet mill, by-product coke ovens, new boiler installation and various other auxiliary work. All materials to be used will be Crane Co. products. B. Floersheim & Co. were awarded the contract for all valves, fittings and flanges by the Koppers Co., which has received the contract for the coke ovens at the Weirton plant.

The plant of the United Steel Co., Everett, Wash., located at Lowell, which was nearly completed when the depression of business came on, has now been completed. It is a 12-in. merchant bar mill, 5 stands, 3 high, and will be operated by an 800-hp. Westinghouse electric motor. The company has orders for several hundred tons of steel, and is expecting early delivery.

Machinery Markets and News of the Works

AUTOMOBILE MAKERS BUYING

Good Business Reported in Detroit and Cleveland Districts

Chicago Orders Show Business Is Coming from More Widely Distributed Sources

Fairly good buying of machine tools by automobile companies is reported from the Detroit and Cleveland districts. The Ford Motor Co.'s plans provide for the addition of new equipment and the rebuilding of old tools to bring up the daily production of cars to 6000. Inquiries are being sent out piecemeal, one during the past week calling for five machines.

The Durant Motor Co. figures as a fairly large prospective buyer in the East as it will engage in large scale production of automobile axles at the plant of the New Process Gear Co., Syracuse, N. Y.

Another prospect of importance is a large New York company which contemplates adding about $200,000 worth of new equipment at its Buffalo plant for production of Diesel engines.

The machine-tool industry is slowly emerging from depression but it is caught between the prospect of advancing costs on the one hand and the large number of used tools still on the market on the other hand. Cincinnati reports that machine-tool builders are losing good mechanics because of attractive offers from other industries, and they face the prospect of paying machinists higher wages to hold their forces. Molders in the Cincinnati district will receive an additional wage of 50c. a day early in February, which will add to the cost of building tools.

While quite a number of price advances have been put into effect since the first of the year, others are in prospect and probably will be announced to take effect Feb. 1.

New York

NEW YORK, Jan. 23.

NO definite trend is indicated by sales of machine tools so far this month. The volume of business is about on a par with that of December and the possibility of a gradually improving demand cannot well be gaged by current developments. There are a few prospects of large-lot buying, such for example as the reported requirements of a large New York company for its Buffalo plant, where Diesel engines are being built. It is said that a tentative list for this plant totaling about $200,000 worth of tools has been made up. The Durant Motors Co., which has been figuring with two or three companies recently for the machining of automobile axles, is reported to have definitely decided to have this work done in the plant of the New Process Gear Co., Syracuse, N. Y., and it is probable that considerable new equipment will be bought for the purpose.

The crane market is quiet as far as purchases are concerned, although there are a fair number of inquiries current. On practically all inquiries competition is exceedingly keen, resulting in orders being placed at low prices.

The Anaconda Copper Mining Co., 25 Broadway, New York, is expected to close soon for a 25-ton, 62-ft. 6-in. span electric crane. The inquiry of the Selbach & Meyers Co., 601 Twenty-second Street, West New York, N. J., for a 10-ton electric crane, that of the Columbia Granite Co., Westerly, R. I., for a 20-ton, with alternate bids on 30-ton and 40-ton cranes, and that of the Phoenix Utility Co., 71 Broadway, New York, for a 60-ton and a 20-ton, 18-ft. span, the latter one motor with alternate bid on hand power, are still pending.

Among recent purchases are:

Canadian National Railways, three 20-ton, 50-ft. boom locomotive cranes, equipped for bucket handling and pile drivers, from the Industrial Works:

J. G. White Engineering Corporation, 43 Exchange Place, New York, a 30-ton, 74-ft. span, three-motor crane for the United Hudson Power Co., Kingston, N. Y., from the Whiting Corporation.

The American Brake Shoe & Foundry Co., 30 Church Street, New York, has plans nearing completion for a new one-story foundry at Houston, Tex.

The Ledox Storage Battery Co., 314 Bergen Street, Brooklyn, recently organized, has arranged for new works at 76 Fourth Avenue. Initial operations provide for the manufacture of plates and castings, with assembling department at the company plant, and other manufacture carried out under contract. Extensions in manufacturing facilities are planned. J. D. Moulton is president and O. W. Larson, secretary and treasurer.

The Howes Transportation & Contracting Co., 539 East Nineteenth Street, New York, has awarded contract to the Levering & Garrigues Co., 552 West Twenty-third Street, for a one-story service and repair building for company trucks at 534 East Nineteenth Street, to cost $75,000.

G. L. and C. H. Stuebner, operating a plant at Thirteenth Street and Vernon Avenue, Long Island City, for the manufacture of iron dumping buckets, hoisting tubs, cars, etc., have organized the G. L. Stuebner Iron Works, Inc., under State laws, with capital of $75,000, to succeed to and expand the present business.

The proposed new service and repair building to be erected by the Studebaker Corporation of America, 1700 Broadway, New York, at Broadway and 131st Street, will be six stories instead of five, as previously announced, 175 x 200 ft., to cost $500,000.

Neuburger Brothers, 3913 Third Avenue, New York, plumbing equipment, pipe, etc., have commissioned D. Bleier, 3223 Kingsbridge Avenue, architect, to prepare plans for a two-story addition, 30 x 82 ft., to cost $23,000.

The Board of Water Supply, Municipal Building, New York, will receive bids until Jan. 30 for gate valves and hydrants to be used on a portion of the Catskill Aqueduct. Former bids have been rejected. George J. Gillespie is president.

The New York Central Railroad Co., New York, C. S. White, room 344, 466 Lexington Avenue, purchasing agent, will receive bids until Feb. 2 for railroad motors and multiple unit control equipment, as set forth under serial contract No. 3, 1923.

The Standard Flexible Conduit Corporation, 158 Eleventh Avenue, New York, has leased space in the Tiffin Building, Jackson and Second Avenues, Long Island City, for branch works.

The Kny-Scheerer Corporation, 56-58 West Twenty-third Street, New York, manufacturer of surgical instruments, etc., has acquired property at Seventh Avenue and Seventeenth Street, where it will remove its plant to provide for increase in production.

S. Blickman, operating a plant on Nelson Avenue, Long Island City, for the manufacture of sheet metal products, kitchen ware, etc., has incorporated a company to be known as S. Blickman, Inc., with capital of $150,000, to succeed to and expand the present plant and business.

The Ottens Harbor Ice & Cold Storage Corporation,

Wildwood, N. J., will commence the erection of a new one and two-story ice-manufacturing and cold storage plant, 80 x 250 ft., to cost $55,000. Mark B. Reeves, Wildwood Trust Building, is architect.

The Branchville Electric Power, Water & Light Co., Branchville, N. J., owned and operated by Charles H. Crisman, has been ordered by the Board of Public Utility Commissioners to make improvements in its plant and system. Electric meters will be installed for individual consumers, replacing a present flat rate plan.

The Board of Works, Chatham, N. J., is planning for the installation of new pumping machinery at the municipal water and light plant, including an electrically-operated feed pump and electric or steam air pump.

The Westinghouse Lamp Co., 165 Broadway, New York, with plant at Bloomfield, N. J., has authorized Stone & Webster, Inc., 147 Milk Street, Boston, engineer, to prepare plans for new works in the vicinity of the present factory, primarily for the manufacture of bases for incandescent lamps. It is estimated to cost $500,000, with machinery.

The Woodbury Ice & Power Co., Woodbury, N. J., has plans nearing completion for a new power house and ice-manufacturing plant. J. J. Summerill is secretary and treasurer.

The General Iron Works, 3-9 Lewis Street, Newark, has leased the three-story and basement building, 35 x 100 ft., at 39-41 South Sixth Street, formerly occupied by the Valley Forge Cutlery Co. It will be remodeled and occupied in February for the manufacture of ornamental and standard wrought iron products, supplementing the regular line of fire escapes and other specialties. The present plant will be removed to the new location.

The Public Service Corporation, Public Service Terminal, Newark, is arranging a fund of $25,000,000 for extensions and improvements in its power plants and system. The work will include a new steam-operated electric generating plant to cost approximately $1,000,000, with machinery. For the South Jersey district the company has closed an agreement with the Philadelphia Electric Co., Philadelphia, for a supply of power; three submarine cables will be installed under the Delaware River for this service, to cost $25,000. The Philadelphia company will proceed with the construction of an addition to its power plant at Beach and Palmer Streets, estimated to cost $6,000,000, with machinery, to be used in connection with the additional power supply.

The New York Steam Corporation, 280 Madison Avenue, New York, will make extensions in its power house at Fifty-ninth Street and the East River, known as Station J, including the installation of additional equipment, to cost $100,000.

Philadelphia

PHILADELPHIA, JAN. 22.

CONTRACT has been awarded by the Electric Power Equipment Corporation, Thirteenth and Wood Streets, Philadelphia, to the John N. Gill Construction Co., 112 South Sixteenth Street, for a new building at Eighteenth and Shamokin Streets to cost $25,000. It will be used in connection with other structures on the site, recently purchased for a new plant.

The Calcos Steel & Iron Co., 1524 Chestnut Street, Philadelphia, has inquiries out for a quantity of mechanical belting, 8 in. wide and over.

John G. Fleck and other officials of the Fleck Brothers Co., Inc., 50 North Fifth Street, Philadelphia, manufacturer of pipe, plumbing equipment, etc., have organized the Fleck-Atlantic Co., with a capital of $200,000, as a subsidiary, to operate at Atlantic City, N. J. George C. Fleck will also be an officer of the new company.

Ovens, power equipment, conveyors, etc., will be installed in the new two-story plant, 87 x 100 ft., to be erected by the Parkway Baking Co., 1226 Ridge Avenue, Philadelphia. Stanton & Stewart, 1524 Chestnut Street, are architects.

The Foreign Trade Bureau of the Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Maracaibo, Venezuela, in the market for pulleys, saws, sawmill and wood-working machinery of American manufacture. Also, from a company at Stockholm, Sweden, desiring information relative to American mixing machinery for baking plants, and from Saltillo, Mexico, for hardware specialties.

The Southwark Ice Co., Twelfth and Washington Streets, Philadelphia, will soon commence the erection of a new plant. A list of machinery has been arranged. Jesse T. Hoekstra, 1713 Sansom Street, is architect.

A manual training department will be installed in the new two and three-story high school, 70 x 270 ft., to be erected at Troy, Pa., estimated to cost $150,000, for which bids will soon be taken. Lawrie, Lawrie & Green, 222 Market Street, Harrisburg, Pa., are architects.

The Pennsylvania Power & Light Co., Allentown, Pa., has acquired the plant and property of the Excelsior Light & Power Co., Sellersville, Pa. Extensions and improvements will be made, including the installation of additional equipment to furnish service to a number of places in this district.

A. B. Faulkner, 720 Fifth Avenue, Williamsport, Pa., is considering plans for the establishment of a factory to manufacture metal electrical operating displays.

The Superior Wire Cloth Co., Hartman Building, York, Pa., H. C. Kugler, head, has revised plans for a one-story factory, 100 x 140 ft., at Turnpike, Pa. John Crowe, Hartman Building, is architect.

The Common Council, Doylestown, Pa., contemplates the installation of electrically-operated pumping machinery at the municipal waterworks.

The Hazard Mfg. Co., Wilkes-Barre, Pa., manufacturer of wire rope, cables, etc., is said to have preliminary plans for a new branch factory at Fort Worth, Tex.

The Meyersdale Electric Light, Heat & Power Co., Meyersdale, Pa., is perfecting plans for the erection of an addition to its power house and the installation of equipment. F. L. Wilmoth is general manager.

A manual training department will be installed in the new two-story high school to be erected at Parker and Clifton Avenues, Collingdale, Pa., estimated to cost $100,000. Folsom & Stanton, Fuller Building, Philadelphia, are architects.

The Philadelphia & Reading Railway Co., Philadelphia, has awarded contract to the Robert E. Lamb Co., 841 North Nineteenth Street, for a new oil storage and distributing plant, 75 x 150 ft., on Spring Street, Reading, Pa., with initial capacity of 200,000 gal.

The Holmesburg Concrete Co., 7660 Frankford Avenue, Philadelphia, is planning for the installation of additional equipment, including mixers, conveyors, block-making machinery, etc. B. L. Zimmerman is in charge.

The Susquehanna Power Co., Delta, Pa., has acquired the local plant and property of the Delta Water Power Co. and the Delta Electric Light Co. Extensions and improvements are planned, including the installation of additional equipment.

The Allentown Paper Box Co., Tenth and Green Streets, Allentown, Pa., has purchased property, 100 x 120 ft., at Jefferson and Liberty Streets, as a site for a new three-story plant, estimated to cost $50,000. It will replace a factory recently destroyed by fire. R. H. M. Rhoda and Louis Laoche head the company.

A refrigerating and cold storage plant will be installed in the four-story packing factory to be erected in the Miller Farm District, near York, Pa., by the Confederated Home Abbatoir Corporation, Gleason G. King, president, People's Bank Building, York, estimated to cost $150,00. The Gorman-Brown Engineering Corporation, 40 Rector Street, New York, is engineer.

The Foley Steel Co., Philadelphia, is in the market for a rotary shear of ¾-in. capacity and under through plate.

A. M. Wood & Co., Inc., Estey Building, 1701 Walnut Street, Philadelphia, is inquiring for 2500 tons of nickel steel scrap of low chrome content; also carbon steel scrap below 0.04 in sulphur and phosphorus.

New England

BOSTON, Jan. 22.

ALTHOUGH far from active, sufficient machine tool business was booked in this territory the past week to indicate that the situation is growing more hopeful. Notifications from manufacturers of shapers, grinding tools and other machinery of advances in prices ranging from 5 per cent to 10 per cent, effective Feb. 1, and the issue of new lists on drills, etc., showing a few readjustments in prices as well as discounts, have but added to the growing optimism in machine tool circles. The amount of prospective business was augmented the past week, but a majority of new inquiries were for one or two machines. In connection with new inquiries, it is of interest to note few are put out with a view to inviting competition. Generally they are received by but one firm, and occasionally by two.

Small tools and parts continue active. The largest local house dealing in such equipment reports January sales to date running slightly in excess of those for the corresponding days last month, and not a single month when bookings have not shown an increase over the previous month since September, 1922.

The two most conspicuous sales the past week concerned about $25,000 worth of grinding equipment purchased by a Connecticut company, and a shaper, wet tool grinder, two

16-in. x 8-ft. lathes, portable electric driven tools, all new, and a used 1¼-in. bolt cutter purchased by a Leominster, Mass., manufacturer. Sales of new low-priced lathes are more frequent, recent transactions including a 24-in. x 16-ft. to a Connecticut interest, a 24-in. x 8-ft. to a local concern, a 11-in. x 5-ft. to a northern Massachusetts shop, a 11-in. x 4-ft. to a Weymouth firm, and a number of bench lathes to Waltham and other nearby shops. A maker of textile machinery purchased a special design 18-in. x 16-ft. lathe. The two largest lathes sold the past week were a new 27-in. to a Maine paper mill, a heavy duty tool, and a used Johnson 30-in. x 22-ft. triple back geared taken by a New Bedford manufacturer. A 17-in. heavy duty new lathe for a Maine concern, several used upright drills for local and New Jersey use, a used 42-in. boring mill taken by a New York State manufacturer, used milling machines and miscellaneous equipment are included in the past week's transactions. Western Massachusetts drop forge interests report having recently purchased Blanchard grinding equipment.

The Collins Motor Car Co., Boston, has leased quarters at 838 Commonwealth Avenue having approximately 25,000 ft. of floor space. A repair shop will be maintained.

The Danbury Unbreakable Tool Co., Danbury, Conn., recently organized with a capital of $50,000, will manufacture cant hooks. Production will start as soon as equipment can be set up. Sufficient business has been booked to insure operations throughout 1923. John W. Stole is president.

The New London Ship & Engine Co., New London, Conn., is working on eighteen submarines and will re-engine six additional boats between now and spring. It recently completed a large marine railroad and in the future anticipates work on a number of vessels to be built by the parent organization, the Submarine Boat Corporation. Except during war, the plant never has been as busy as it is today.

A one-story power house is being constructed by the Wiilliam H. Brown & Son Co., 420 Central Street, Winchendon, Mass., manufacturer of woodenware products, in connection with an addition, estimated to cost $75,000.

The Bantam Ball Bearing Co., Bantam, Conn., has completed plans for a new plant at Litchfield, Conn., estimated to cost $150,000, including machinery. Fletcher-Thompson, Inc., 543 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

A vocational department will be installed in the high school to be erected on Dunbar Avenue, Dorchester, Mass., three stories and basement, estimated to cost $1,000,000. McLaughlin & Burr, 88 Tremont Street, Boston, are architects.

The M. P. Brundige Co., 147 Pearl Street, Boston, operating a general millwright works at 137 Welles Avenue, is planning for the installation of additional machine shop and foundry equipment.

The American Brass Co., Waterbury, Conn., has awarded contract to the Tracy Brothers Co., Waterbury, for a three-story brick and steel addition, 80 x 100 ft.

The Springfield Body Corporation, Springfield, Conn., recently organized to succeed the Smith-Springfield Body Corporation, is disposing of a stock issue of $1,935,000, the proceeds to be used for expansion, including the installation of machinery in a building at Bloomfield, N. J., for the manufacture of commercial automobile bodies, and for the acquisition and equipment of a second branch plant at Pontiac, Mich., where option has been secured on an existing building approximating 283,000 sq. ft. C. S. Dame is president.

The O. W. Siebert Co., Gardner, Mass., manufacturer of children's vehicles, etc., now occupying temporary quarters, will break ground in the spring for a new plant at Main and Washington Streets, for which plans are now being drawn. Otto W. Siebert, formerly connected with the Bay State Metal Wheel Co., East Templeton, Mass., heads the company.

A manual training department will be installed in the proposed junior high schol building to be erected at Lathrop and Southworth Streets, West Springfield, Mass., for which bids will be received on a general contract until Feb. 6. Charles G. Loring, 7 Water Street, Boston, is architect.

The Stanley Works, Inc., New Britain, Conn., has awarded contract to the Aberthaw Construction Co., Boston, for an eight-story addition, 60 x 168 ft., to cost $250,000, including equipment.

A manual training department will be installed in the two-story and basement high schol to be erected on Union Street, Burlington, Vt., estimated to cost $400,000. F. L. Austin, 240 College Street, is architect.

The Beacon Oil Co., 111 Devonshire Street, Boston, has disposed of a preferred stock issue of $1,000,000, a portion of the proceeds to be used in connection with extensions in its refinery at Beacham, Mass.

Baltimore

BALTIMORE, JAN. 22.

THE Porcelain Enamel & Mfg. Co., O'Donnell and Eighth Streets, Baltimore, plans to rebuild its works, destroyed by fire several months ago. The new building will cost about $150,000.

The Tin Decorating Co., Boston Street and Linwood Avenue, Baltimore, will build a one-story factory, 106 x 168 ft.

The Hatfield Resilient Wheel Co., 431 Munsey Building, Baltimore, will take bids early in February, for a new one-story plant, 50 x 100 ft., on Wells Street, estimated to cost $35,000. Schuyler C. Hatfield is president.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Feb. 13 for 10,000 sq. ft. of copper wire screen, for use at the Mare Island Navy Yard, San Francisco, as set forth in Schedule 443.

Ovens, power equipment, conveyors, etc., will be installed in the addition to be constructed at the plant of the Meade Baking Co., 1107 Aisquith Street, estimated to cost $35,000. John Freund, Baltimore, is architect.

The Rapidan Soapstone Corporation, Orange, Va., recently organized with a capital of $200,000, is planning the erection of a new mill for commercial soapstone production near Somerset, Va., where 185 acres has been taken over. Grinding and pulverizing machinery will be installed, and a power house erected. Kesee Brooking is president, and D. N. Davidson, secretary and treasurer.

The Magneto & Machine Co., 1031 Cathedral Street, Baltimore, has plans for extensions in its two-story machine shop, to cost about about $17,000. John Freund, 1307 St. Paul Street, is architect.

The Maryland Meter Works, Holliday and Saratoga Streets, Baltimore has plans for a seven-story, reinforced concrete factory, with one-story structure adjoining, to replace its present five-story building, to cost $150,000.

The Winchester Lumber Co., Winchester, Va., has plans for extensions in its lumber and wood-working plant at Gore, Va., to double the present capacity. It will cost more than $125,000, with machinery. W. B. Cornwell is president and general manager.

An electric power plant will be constructed by the Pacific Mills Co., Lawrence, Mass., at its proposed new mill at Spartanburg, S. C., for finishing and bleaching textiles, estimated to cost approximately $2,000,000, with machinery.

The Downie Co., Inc., 201 National Bank Building, Suffolk, Va., recently organized to manufacture motor-driven farm cultivators, agricultural implements, etc., has plans for a one-story factory at Nansemond, Va., approximating 10,000 sq. ft., estimated to cost $35,000. A complete machine shop will be installed. C. E. Downie is president, and George D. Gravely general manager. A. B. Williams, Newport News, Va., is architect and engineer.

The Common Council, New Windsor, Md., will make extensions and improvements in the municipal electric power plant, including the installation of additional equipment.

The Board of Education, School Building Commission, 110 Twenty-fifth Street, Norfolk, Va., will soon take bids for a three-story industrial school, 70 x 576 ft., estimated to cost $500,000. A site has been selected at Maltby Street and Reservoir Avenue. Benjamin F. Mitchell, Seaboard Bank Building, is architect.

The General Purchasing Officer, Panama Canal, Washington, will receive bids until Feb. 9 for mechanical equipment for the canal zone, including chain hoists, cast steel bearings, brass valves, steel cans, steel drums, steel bolts and rivets, marine boiler furnaces, Circular 1511; until Feb. 5 for other equipment as listed in Circular 2309, including tackle blocks, galvanized malleable iron pipe fittings, brass tubing, etc.

Merry Brothers, foot of Gwinnett Street, Augusta, Ga., operating a brick manufacturing plant, are planning the installation of additional machinery for the manufacture of tile products. A. H. and E. B. Merry head the company.

The Chicago Nipple Mfg. Co., 4109 First Avenue, Baltimore, is making inquiries for a 22 in. x 8 ft. screw cutting engine lathe, single back gear.

The Great Maryland Airlines, Inc., Baltimore, Edward J. Geis, 2038 Eutaw Street, secretary, recently organized with a capital of $100,000, is planning the erection of a new plant to manufacture aeroplanes, constructed of light steel sheets and aluminum. The initial works will be given over primarily to assembling, with parts manufactured under contract. Later a department of the latter character will be installed. William W. Radford, Jr., is president.

The Baker County Power Co., Newton, Ga., is planning to rebuild the portion of its electric power plant recently destroyed by a flood on the Nochaway River, with loss estimated at $75,000. R. L. Hall, Newton, is an official of the company.

The Greenville Ice & Cold Storage Co., Greenville, S. C., recently organized, has acquired a building at Camp Sevier, near Greenville, and will remodel the structure for a new plant. Machinery to cost about $50,000 will be installed. J. W. Gantt is vice-president and general manager.

A manual training department will be installed in the proposed two-story and basement high school to be erected at Treston, N. C., estimated to cost $80,000, for which bids on a general contract will be called in February. Leslie N. Boney Murchison Building, Wilmington, N. C., is architect.

The Continental Roofing & Mfg. Co., Baltimore, recently organized, has acquired the plant of the McHenry-Millhouse Mfg. Co. and will establish a works for the manufacture of roofing products. Thomas M. Riangard heads the company.

Pittsburgh

PITTSBURGH, Jan. 22.

MACHINE tool business is fairly good in this territory and in some quarters buyers show less disposition to "peddle" their inquiries. In other words, they are not broadcasting inquiries in the hope of developing competition. Optimism is somewhat tempered by the fact that a good many orders, which it was confidently expected would now be placed, are not coming in.

The advances in prices which became effective around Jan. 1 are causing many buyers to turn to used machinery. Present costs of new tools usually are so much in excess of original appropriations that a good many orders are held up pending a decision as to whether the requirement is sufficiently pressing to warrant an increase in the appropriation. Used machinery is much more active than new. Sales of the latter run generally to individual tools. The National Tube Co. is purchasing steadily against its list for the new plant at Gary, Ind. The International Nickel Co. recently bought through Manning, Maxwell & Moore, Inc., two Sutton-Abramsen straighteners for its Huntington, W. Va., plant.

The Myers Machine Tool Corporation, Columbia, Pa., advises that the report in these columns Jan. 18 that it had advanced its price of lathes 10 per cent is an error. There has been no change in its lathe prices since last July when they were reduced.

Much activity recently has been marked in power equipment. The Pittsburgh Crucible Steel Co. placed a 2500-hp. motor for driving a 28-in. 3-high. billet mill with the General Electric Co., and this company also secured recently an order for five 5000-kw. d.c. generators for the Niagara Falls plant of the Aluminum Co. of America, a 1000-hp. pump drive motor for the Duquesne Works, Carnegie Steel Co., and a 2500-kw. extraction turbine for the Painesville, Ohio, plant of the Diamond Alkali Co.

Dillon Brothers, Wheeling, W. Va., which are putting up a new plant at Bridgeport, Ohio, are in the market for a 10-ton or a 15-ton crane. The Koppers Co., Pittsburgh, is inquiring for two 10-hp. clay skip hoists for the Clairton by-product plant of the Carnegie Steel Co. Crane inquiry is reported good, but sales the past week have been few.

The Board of Public Education, 1326 Fulton Building, Pittsburgh, will take bids until Feb. 1 for equipment for the addition to the Peabody high school, Margaretta and Beatty Streets, including motors, mechanical fans, boilers, temperature control apparatus, etc. George W. Gerkig is secretary.

The West Penn Power Co., West Penn Building, Pittsburgh, will commence the erection of a new generating plant in the vicinity of Beach Bottom, estimated to cost $1,000,000. It will have a capacity of 30,000 kw.

The Gulbert Engineering Co., 703 Diamond Bank Building, Pittsburgh, recently organized, has awarded contract to the Memphis Steel Construction Co., Magee Building, for its one-story steel fabricating plant, 50 x 200 ft., estimated to cost $100,000, including machinery.

A manual training department will be installed in the two-story and basement high schol to be erected at Charleroi, Pa., estimated to cost $150,000, for which bids on a general contract are being received until Feb. 1. J. J. Brenton, Charleroi, is architect.

The Consolidated Light, Heat & Power Co., Huntington, W. Va., will build an addition to its power plant at Kenova, W. Va., to increase the capacity about 75 per cent. A new 15,000-kw. turbo-generator will be installed and auxiliary machinery.

Receivers for the Pittsburgh Railways Co., 435 Sixth Avenue, Pittsburgh, have received authority to expend $211,300 for improvements, including the installation of additional electrical and steam power equipment, cables and feeder lines, etc. C. A. Fagan, W. D. George and S. L. Tone are receivers.

A manual training department will be installed in the new junior high school to be erected at Breckenridge, Pa., estimated to cost $150,000, for which John H. Phillips, Fulton Building, Pittsburgh, is architect.

The Blackwood Electric Steel Corporation, Parkersburg, W. Va., has awarded a general contract to Plate & Vogel, Parkersburg, for its one-story plant, 140 x 230 ft., to cost in excess of $60,000. It will specialize in the production of steel and semi-steel castings. F. S. Blackwood is head. Mills, Rhones, Bellman & Nordhoff, Ohio Building, Toledo, Ohio, are architects.

The United States Engineer Office, Huntington, W. Va., will receive bids until Jan. 27 for equipment, including valves, unions, bushings, coil fittings, gaskets, galvanized and black wrought iron pipe, as set forth in Circular 62.

The Odin Stove Mfg. Co., Erie, Pa., will commence the erection of a two-story addition, 40 x 160 ft., estimated to cost $30,000.

A manual training department will be installed in the two-story and basement senior and junior high school, 125 x 132 ft., to be erected on Indiana Avenue, Monaca, Pa., estimated to cost $100,000, for which bids on the superstructure are being taken. John H. Phillips, Fulton Building, Pittsburgh, is architect.

The Kentucky & West Virginia Power Co., 30 Church Street, New York, R. E. Breed, president, has awarded contract to the Foundation Co., 120 Liberty Street, for its proposed power plant addition at Logan, W. Va. A 125-mile steel tower transmission line will also be built from Logan to Hazard, Ky. The work will cost $800,000.

Detroit

DETROIT, JAN. 22.

TENTATIVE plans are under consideration by the Falcon Mfg. Co., Big Rapids, Mich., manufacturer of kitchen cabinets, etc., for a new two-story plant, estimated to cost $50,000.

The Harringer Foundry & Machine Co., 1011 Rivard Street, Detroit, is planning for the installation of additional equipment, including lathes and drill press.

The Met-All Mfg. Co., Holly, Mich., manufacturer of steel ladders and kindred products, is planning for enlargements to include the removal of the Detroit works to this location.

The Detroit Weatherproof Body Co., Corunna, Mich., manufacturer of automobile bodies, has tentative plans for a new two-story and basement factory, 60 x 100 ft., to cost $150,000, including machinery.

A manual training department will be installed in the new three-story and basement high school to be erected on River Avenue, Holland, Mich., estimated to cost $250,000. Robinson & Campau, Michigan Trust Building, Grand Rapids, Mich., are architects.

The Kramer Produce Co., Casnovia, Mich., is considering plans for rebuilding the portion of its refrigerating and cold storage plant, destroyed by fire Jan. 13, with loss estimated at $100,000, including a warehouse on adjoining site.

The Board of Directors, Sacred Heart Seminary, 1219 Washington Boulevard, Detroit, will build a two-story power house, 64 x 147 ft., in connection with a new group of buildings, estimated to cost $500,000.

The Pere Marquette Railroad Co., Fort Street Union Station, Detroit, has plans for a new engine terminal at Twenty-first and West Jefferson Streets, including repair shops and mechanical buildings, estimated to cost $100,000, with equipment.

A manual training department will be installed in the new high school to e erected at Coldwater, Mich., for which bids are being received on a general contract, estimated to cost $150,000. R. A. Leroy, Pratt Building, Kalamazoo, Mich., is architect.

The Mueller Furniture Co., 600 Monroe Avenue, Grand Rapids, Mich., will take bids about Feb. 15 for a five-story and basement addition, 50 x 100 ft., to cost $90,000, with machinery. Alexander McColl, 802 Michigan Trust Building, is architect. Frederick Mueller is president.

The Filer Fibre Co., Filer City, Mich., is arranging for the installation of machinery in its new paper mill at Manistee, Mich., now in course of erection, estimated to cost $75,000. M. Oberdorfer is vice-president.

A manual training department will be installed in the two-story and basement Lee Street junior high school, 70 x 175 ft., to be erected at Grand Rapids, Mich., for which bids

are being taken on a general contract. It will cost $100,000. H. H. Turner, 923 Michigan Trust Building, is architect.

The Blakely Mfg. Co., Detroit, has moved into a new factory containing about 12,000 sq. ft. on one floor, located on a two-acre lot which it has purchased, fronting on Fullerton Avenue and extending through from Monnier Road to Hartwell Boulevard. It manufactures steel fastenings for holding automobiles in position when being shipped in freight cars. The company is now running in excess of four miles of wire per day and is equipping for a more extensive production in its regular lines as well as some new lines to prepare it for the manufacture of shipping fastenings for the general manufacturing trades.

Buffalo

BUFFALO, JAN. 22.

THE Niagara Blower Co., 486 Howard Street, Buffalo, manufacturer of ventilating and dust-collecting systems, etc., has plans for a new one-story factory, 60 x 180 ft., on property recently acquired on Ontario Street, comprising a tract 330 x 660 ft. Paul H. Schoepflin is president.

The Oldman-Magee Boiler Works, Inc., Buffalo, has been incorporated with a capital of $300,000 to take over and consolidate the Oldman Boiler Works, 38 Illinois Street, and the Marine Welding Co., same location. The merged company will continue at the present plant and expand the works for the manufacture of engines, boilers and kindred products. It is headed by E. W. and M. S. Oldman, and C. D. Magee.

The Merchants' Despatch Transportation Co., East Rochester, N. Y., manufacturer of refrigerator railroad cars, is planning for the installation of equipment in an addition, to include annealing furnaces, hydraulic presses and other iron-working and sheet steel apparatus. L. S. West is general manager.

A manual training department will be installed in the new high school to be erected at Johnstown, N. Y., estimated to cost $325,000. Tooker & Marsh, 101 Park Avenue, New York, are architects.

The Pahud Lumber Co., Inc., Harrisville, N. Y., is planning the establishment of a new machine repair shop and wood-working plant with installation to include metal-working lathe, drill press, bench tools, etc. H. J. Corbitt, Benson Mines, N. Y., is in charge.

The Dominion Feldspar Corporation, Rochester, N. Y., has plans for the erection of a new one-story grinding mill, 52 x 104 ft., at its plant at the Genesee Dock, foot of Boxart Street. H. S. Schneider is manager.

Manual training equipment will be installed in the two-story high school addition, 146 x 150 ft., to be erected at Perry, N. Y., for which bids on a general contract are being asked until Feb. 2. Gordon & Kaelber, 125 Sibley Building, Rochester, N. Y., are architects.

The Niagara, Lockport & Ontario Power Co., Lafayette Building, Buffalo, has acquired about 12 acres at Lackawanna as a site for a new electric generating plant estimated to cost $250,000.

The Northern Art Stone Co., Malone, N. Y., manufacturer of artificial stone, building blocks, etc., is planning for the installation of new equipment, including crushing and screening apparatus, conveying machinery, etc. A. C. Allison is in charge.

Arthur W. Kreinheder, commissioner of public works, Municipal Building, Buffalo, will take bids until Jan. 29 for special pipe castings for use at the filter plant of the municipal waterworks. Plans are at the office of the engineer of the filtration division.

Cleveland

CLEVELAND, Jan. 22.

MACHINE tool manufacturers report an increased volume of prospective business and the outlook very promising. Some good business is coming from the automotive industry which is buying equipment for the manufacture of new models and replacements. The plant of one manufacturer of drilling machinery is now comfortably filled with orders, mostly taken recently from the automotive and parts manufacturers.

It is understood that the plans of the Ford Motor Co. provide for the addition of new equipment and the rebuilding of old tools to bring its plant up to a daily capacity of 6000 cars, which has been announced as the prospective production schedule. The Ford company is sending out its inquiries piecemeal, one during the week being for five special machines. Engineers and architects are figuring on considerable work in new plants and this in time should be reflected in the machinery market. Last year there was virtually no factory construction of any size in this territory. Business with local machinery houses during the week was slow, being limited mostly to single machines.

The Foote-Burt Co., Cleveland, has announced a 10 per cent price advance on its line of drilling, boring and tapping machines.

The Buckeye Traction Ditcher Co., Findlay, Ohio, during the week purchased a 30-in. lathe and has an inquiry out for a side head boring mill.

Fire a few days ago destroyed the No. 1 punch shop and joiner of the American Shipbuilding Co. Lorain, Ohio. It contained a large amount of equipment, but it is not known as yet to what extent it can be salvaged. The plant will be rebuilt and new equipment will be required. An inquiry has already been sent out for some wood-working machinery to replace that destroyed.

The W. S. Tyler Co., Cleveland, is having plans prepared for an addition. The George S. Rider Co. is the engineer.

The Cox Brass Mfg. Co., 5601 Carnegie Avenue, Cleveland, will erect a machine shop and warehouse at 1555 East Fifty-fifth Street. It will be 60 x 200 ft. and will be used for the manufacture of automobile bumpers.

The Ohio Injector Co., Wadsworth, Ohio, will place contract shortly for another extension.

The Forest City Foundry & Mfg. Co., Cleveland, has acquired a 4½ acre site for a plant on the Big Four Railroad at West Ninetieth Street. Plans for the new works are still in the formative stage.

The Velte Brothers, Grand Rapids, Mich., are equipping a furniture manufacturing plant at 867 South High Street, Akron, Ohio.

Cincinnati

CINCINNATI, Jan. 22.

WHILE orders for one and two machines constitute present activity, the number booked by machine tool manufacturers in this district runs into a very encouraging aggregate, and with new inquiries, indications point to much better business during the next six months than for the past two years.

Shops are constantly adding men to their forces and labor shortage is being felt, particularly of high-grade mechanics. Attractive offers of steady work at high wages are taking men away from the machine shops. Manufacturers are checking production costs closely with a view to making them cover the actual cost of manufacturing, and while labor charges constitute a large part of the cost of producing tools, material costs are no small item and have been rising steadily since last fall. Molder's wages will advance 50c. per day early in February.

Prospects are for a general advance in machine tool prices, and some buyers have already recognized the trend and covered for a large part of their nearby requirements.

The Columbia Machine Tool Co., Hamilton, Ohio, has purchased the patterns, jigs, and tools of the Hollingsworth Machine Tool Co., shaper manufacturer, Covington, Ky., and the Hollingsworth shaper and lathes will in the future be built by the Columbia company. C. I. Hollingsworth, who has been connected with the machine tool industry in Cincinnati for many years, will retire from active business life and the plant and equipment of the Hollingsworth company will be sold at private sale.

The new plant of the Ideal Concrete Machinery Co., Spring Grove Avenue, Cincinnati, is practically completed and production will commence in about three weeks, part of the machinery having been moved from the Colerain Avenue works. In addition to manufacturing concrete molds, it builds tumbling barrels for foundries and reports orders for this line improving steadily.

The Pennsylvania Railroad shops at Mount Vernon, Ohio, were practically destroyed by fire Jan. 20. The loss is estimated at $300,000. Six hundred employees will be temporarily out of employment.

The plant of the Alco Foundry & Machine Co., Hamden, Ohio, which was destroyed by fire Jan. 4, will be rebuilt as soon as possible. The loss was $25,000. John Abele is president of the company.

The Everwear Mfg. Co., Springfield, Ohio, will shortly

let contract for an addition to its plant, 90 x 220 ft., to be used as a plating and galvanizing department. It manufactures playground apparatus. C. E. Hoppes is vice-president.

The Nolte Brass Foundry Co., Springfield, Ohio, has been incorporated with a capitalization of $100,000. It has been operating as a partnership, and no changes in the organization are contemplated.

Chicago

CHICAGO, Jan. 22.

WHEREAS in 1922 the railroads and the automotive industry were the chief buyers of machine tools in this market, orders are now coming from widely distributed, miscellaneous sources. Bookings of local machine tool houses thus far this month are on a par with those for the same period in December. Buying is still rather limited, however, compared with the large number of inquiries which are pending. Machine tool users generally are busy, but apparently have not yet reached the point where they are ready to close for additional equipment. Manufacturers of brass plumbing goods are exceptionally active because of the extensive building operations now under way. There have been no new developments in railroad buying. In addition to the larger roads which have figured prominently as machine tool buyers, a number of smaller lines with headquarters in this city are reported to be surveying their machine tool needs.

No further price changes have been announced, but indications point to general advances Feb. 1.

The Interstate Iron & Steel Co., Chicago, has placed with the Morgan Engineering Co. a three-motor, 30-ton, 106-ft. 6-in. span overhead electric traveling crane, with a 10-ton auxiliary hoist. The Whiting Corporation, Harvey, Ill., has booked the following orders for cranes and foundry equipment: 20-ton hand power crane for the Henry L. Doherty Co., New York; 60-ton electric overhead traveling crane for the Consumers Power Co., Jackson, Mich.; 15-ton hand power crane for the United States Coal & Coke Co., Pittsburgh; two 48 x 81-in. class A tumblers for the Central Foundry Co., New York; 36-in. cupola for the Brinkley Co., Seattle, Wash.; 60-in. cupola for the Lakey Foundry & Machine Co., Muskegon, Mich.; 72-in. cupola for the Tredegar Iron Works, Richmond, Va.

The American Three-Way Luxfer Prism Co., manufacturer of skylights, 1305 South Fifty-fifth Court, Chicago, has purchased 150,000 sq. ft. on the west side of Fifty-fifth Court at Roosevelt Road, and will erect a one and two-story plant to cover 40,000 sq. ft., at a cost of $90,000.

Hetzel & Co. packers, 1739 Larrabee Street, Chicago, are having plans prepared by D. I. Davis & Associates, 327 South La Salle Street, for a one and two-story power plant, 70 x 122 ft., to cost $60,000.

The Standard Conveyor Machine Co., St. Paul, Minn., has purchased the Brown Portable Elevator Machinery Co., North Chicago, Ill., and will continue to operate the plant in the latter city.

The Edwards Iron Works, 2101 South Main Street, South Bend, Ind., will build an addition to cost $12,000.

Fire destroyed the foundry of the Mount Vernon Car Mfg. Co., Mount Vernon, Ill., Jan. 11. The foundry was built in 1890 and had been in continuous operation for more than 32 years. It had a capacity of 450 carwheels daily. The building was approximately 200 ft. square. The company plans the erection of a new foundry equipped for mechanical molding.

The Arcade Mfg. Co., Freeport, Ill., manufacturer of molding machines, is having plans prepared for a new power house and wood shop, together with plant alterations, to cost $60,000.

An explosion and fire at the plant of the Wilson Foundry & Machine Co., Pontiac, Mich., Jan. 9, resulted in a loss estimated at $35,000. The chief damage was the loss of the storage building, containing 1000 engine blocks. The operation of the plant was not interrupted.

The Rosen Machine Works, Davenport, Iowa, has purchased a site for a new factory on East Second Street, adjoining the office of the Firestone Rubber Co. Plans are being drawn.

The Great Northern Chair Co., 2500 Ogden Avenue, Chicago, has leased 100,000 sq. ft. between Nineteenth and Twentieth Streets on Western Avenue, to be used as additional manufacturing space.

The Wearwell Sign Co., manufacturer of wood and metal signs, previously located at 1509 Clybourn Avenue, Chicago, has leased 11,000 sq. ft. of floor space at 833 Rees Street.

The Central Power Co., Grand Island, Neb., has let contracts for a 5000-kw. power plant near the Platte River, close to the junction of Merrick, Hamilton and Hall counties. It will not be a water power plant, but there will be an abundance of water for condensing purposes. The plant will cost $500,000.

The American Flange & Mfg. Co., recently incorporated, 2949-53 West Van Buren Street, Chicago, will manufacture a special bushing or sput that is inserted or applied to the bung of steel barrels, tanks, and other containers by dies in a manner calculated to make them leakproof. The company has leased 10,000 sq. ft. of space at the address given, and has most of its equipment. It is in the market for a used punch press of approximately 75 tons capacity. The officers include M. Schwartz, president; S. Schwartz, secretary, and R. L. Parish, vice-president and treasurer.

The City Council, Oskaloosa, Iowa, has plans for a new municipal hydroelectric generating plant at Harvey, Iowa, estimated to cost $375,000. Burns & McDonald, 402 Interstate Building, Kansas City, Mo., are engineers.

A manual training department will be installed in the new three-story high school, 200 x 420 ft., to be erected at Chisholm, Minn., estimated to cost $350,000, for which bids will soon be called. German & Jenssen, Exchange Building, Duluth, Minn., are architects and engineers.

The Chicago & Northwestern Railroad Co., 226 West Jackson Boulevard, Chicago, has plans for a new one-story boiler house and machine shop at Winona, Minn. J. T. Irvin, Winona, is architect.

The Electrical Dealers Supply Co., 162 West Randolph Street, Chicago, manufacturer of electrical fixtures and equipment,, has awarded contract to the Schanner Construction Co., 139 North Clark Street, for a three-story and basement plant, 100 x 200 ft., to cost $250,000, including equipment. Simon Frankel is president.

The United Light & Railways Co., Davenport, Iowa, is disposing of a bond issue of $2,500,000, a portion of the proceeds to be used for extensions and improvements in its generating plants and system. Frank T. Hulswit is president.

A manual training department will be installed in the new high school to be erected at Beatrice, Neb., estimated to cost $100,000.

The Central Illinois Public Service Co., Springfield, Ill., will commence the erection of a new one-story ice-manufacturing and cold storage plant at Charleston, Ill., 75 x 75 ft. L. D. Roberts, 130 North Sixth Street, Springfield, is company engineer.

The Denver Gas & Electric Light Co., Denver, Colo., has preliminary plans for a new steam-operated electric power plant in the vicinity of Boulder, Colo., estimated to cost $10,000,000, including machinery and transmission system. The project will be carried out with the Western Light & Power Co., with headquarters at Boulder.

A manual training department will be installed in the high school to be erected by the Henry Township High School Board, Henry, Ill., estimated to cost $100,000.

The Maytag Co., Newton, Iowa, wants to buy a Monarch Simplex oil furnace with capacity of 2000 lb. aluminum per charge.

Milwaukee

MILWAUKEE, Jan. 22.

NOT alone do current sales make up a fair-sized volume, but new business in prospect of placement between now and April 1 in this territory is encouraging. More capacity is becoming occupied by the execution of new orders and working forces are gradually being enlarged. Builders of refrigerating machinery are busier than for about three years, due to the broad call for artificial ice producing equipment, especially in the northern zone where such installations have been relatively infrequent. Wood-working machinery is also selling readily. Paper and pulp mills are enlarging. Several large hydroelectric installations of importance are projected in Wisconsin. Garage and service building construction are also of large volume.

The Milwaukee Central Board of Purchases, City Hall, is asking sealed bids until Jan. 30 for furnishing the water department with three 42-in. venturi tube meters, complete with register, indicating and recording devices, and six 42-in. hydraulically operated gate valves, for the new Riverside pumping station. W. R. Callahan is chief purchasing agent.

The Badger Lumber & Mfg. Co., Oshkosh, Wis., is breaking ground this week for a new plant costing about $150,000, with equipment, to replace the factory and power-house destroyed by fire Jan. 4. Individual motor drive is specified on all machinery. The capital stock has been increased from $100,000 to $250,000 to finance the project. The principal product is office furniture.

The municipal water works department, Fond du Lac, Wis., is asking for sealed bids for furnishing and installing a new pumping unit of 5,000,000 gal. capacity. Bids will be opened Feb. 15. J. J. Breister is superintendent.

The Wisconsin Truck Co. of Madison, Wis., recently incorporated with $25,000 capital stock, is negotiating for the lease of a suitable factory for assembling motor trucks. For the present only a small list of machinery will be required, as most units and parts will be purchased from specializing concerns. John C. Westmont, C. W. Keniston and O. B. Porter are the principals.

The Wenstone Rubber Products Co., Chicago, has purchased from the receiver the plant and property of the defunct Boone Tire & Rubber Co., Chippewa Falls, Wis., and will employ these facilities for manufacturing automobile tires and tubes at the rate of 1000 casings daily. Changes, involving some retooling, are under way. The plant has been idle since January, 1920. J. L. Wharton has been appointed works manager.

The Board of Education, Lancaster, Wis., has engaged Parkinson & Dockendorff, architects, La Crosse, Wis., to design a new high school with manual training department, the cost not to exceed $175,000. Bids will be taken soon by F. J. Glanville, secretary of the board.

A. R. Wiens Sons Co., Fond du Lac, Wis., has been incorporated with a capital stock of $25,000 to manufacture wire brushes and brooms. The upper floor of the Nash Garage, 24-26 Third Street, has been leased and is being equipped. The concern formerly operated in Milwaukee at 4220-4228 Vliet Street. This equipment will be supplemented about twofold. George R. Wiem is president and general manager.

The Waupun General Repair Shop, Waupun, Wis., has been organized as a partnership among Herman Erdman, Michael Derfus and Joseph Hiller to engage in the general machinery repair business. All are former employes of the J. S. Morris Co., which lost its plant by fire last fall. J. S. Morris has retired from business but is erecting a new machine shop building for occupancy by the new concern. Some new and used machinery is being purchased.

The Mayville, Wis., Board of Education is asking bids until March 1 for a new high school estimated to cost $200,000 and having provision for vocational instruction. Plans are being completed by Parkinson & Dockendorff, architects, La Crosse, Wis. Alvin Draeger is clerk of the board.

The Board of Education, Gays Mills, Wis., expects to take bids about March 15 for a $100,000 high school with industrial education facilities, designed by Parkinson & Dockendorff, architects, La Crosse, Wis. E. L. Nelson is president of the Board.

The S. Miller Fruit & Storage Co., Rhinelander, Wis., has been incorporated with a capital stock of $200,000 by Sam, Leo and Isaac Miller and plans are being prepared by M. R. Carpenter, architect, 72 West Washington Street, Chicago, for two new cold storage warehouses, each three stories, 50 x 135 ft., one to replace the present Rhinelander plant and the other a new branch house at Marshfield, Wis. Two artificial ice producer units will be purchased. The investment will be about $75,000 for each plant.

The Rexovent Co., La Crosse, Wis., has been organized by Victor Henriksen, who is establishing a factory for the production of patented ventilating devices for commercial, industrial and domestic buildings. Other sheet metal specialties will be introduced later. Some new equipment is being purchased, although the principal requirements have been filled.

The Heilprin Fruit Co., Madison, Wis., has plans by Edward Tough, local architect, for a $90,000 fruit and general cold storage warehouse, 75 x 150 ft., three stories, requiring a new artificial ice producer unit and refrigerating system. Bids will be taken about March 10.

Karl N. Knudsen, 107 North Farwell Street, Eau Claire, Wis., will build a new machine and forge shop, 55 x 100 ft., part two stories, at an estimated cost of $25,000. Inquiry is being made for additional equipment.

The Western Screw & Specialty Co., Racine, Wis., manufacturer of fabricated bolts and nuts, has incorporated without change of style and with a capital stock of $75,000. The principals are Robert Kosterman and Frank G. Miller, founders of the business. Enlargement of the shop is contemplated.

Indiana

INDIANAPOLIS, Jan. 22.

THE Gohmann Brothers & Kahler Co., Silver and Railroad Streets, New Albany, Ind., manufacturer of stoves, ranges, etc., has plans for a two-story and basement foundry, 30 x 225 ft., estimated to cost $35,000. Arthur R. Smith, Norton Building, Louisville, is architect.

The Indiana Electric Corporation, Indianapolis, is disposing of a bond issue of $4,500,000, a portion of the proceeds to be used for extensions and improvements, including the construction of a new steam-electric generating plant with initial capacity of 40,000 kw.

The Cannelton Sewer Pipe Co., Cannelton, Ind., has awarded contract to the Hoffman Construction Co., Furniture Building, Evansville, Ind., for the erection of a new four-story factory, 75 x 130 ft., with power plant adjoining, estimated to cost $200,000, including machinery.

The Stigëlmeyer Mfg. Co., Indianapolis, recently organized under Delaware laws with a capital of $10,000,000, has selected a site at Seymour, Ind., for a new plant to manufacture patented automatic train control equipment. Plans for the initial works will be drawn at once. The plant, with machinery, will cost approximately $250,000. Edward Stiegelmeyer, 1446 Prospect Street, Indianapolis, heads the company.

The Board of County Commissioners, Crown Point, Ind., will build a one-story power plant in connection with the erection of a new tuberculosis sanitarium on site near the city, estimated to cost $250,000. Bids will be called early in March. Karl D. Norris, Calumet Building, East Chicago, Ind., is architect.

The Indiana Reformatory Commission, Indianapolis, has made application for an appropriation of $1,991,865, to be used in connection with the new State reformatory at Pendleton, Ind., upon which work has been commenced. The fund will be used for the construction of two two-story and basement vocational buildings, "Q" and "R"; the first will include sheet metal working, wood-working, machine and other shops, while the second structure will provide for a forge shop, electrical and other mechanical shops. Two other industrial buildings will also be erected, each two-stories, 60 x 200 ft., while tentative plans are being considered for a one-story foundry. A main power house will be built to cost $175,000 with electric system, including switchboard, transformers, etc., estimated to cost $51,000 additional. An ice-manufacturing and refrigerating plant will be installed to cost $290,000, including mechanical kitchen equipment. The committee in charge of purchases is composed of J. W. Nash, Indianapolis; John O'Neil, Indianapolis, field examiner for the State board of accounts, and Joseph E. Henning, Anderson, Ind.

The Board of Education, Gary, Ind., has plans for a new one-story machine shop and foundry, 70 x 115 ft., with mechanical laundry building, on Sixth Street, for use in connection with the vocational schools, estimated to cost $42,000. J. H. Wildermuth, 690 Broadway, is architect.

The Star Foundry Co., Evansville, Ind., is inquiring for a complete set of light weight top radiator furnace patterns in 22-in. and 24-in. sizes.

The Gulf States

BIRMINGHAM, JAN. 22.

THE Great Texas Oil & Refining Co., Breckenridge Tex., has construction under way on a new oil refinery with daily capacity of 500 bbl. A number of units will be installed for the production of lubricating oils and by-products, with power house and machine shop. The new plant with machinery will cost $1,000,000.

The Rio Grande Tire & Rubber Co., Harlingen, Tex., will build a plant on site selected for the manufacture of automobile tires, etc., to cost $50,000.

The McIntosh Utilities Co., McIntosh, Fla., has tentative plans for a new electric light and power plant for local service. S. H. Gaitskill is president.

G. L. Jones, Marble Falls, Tex., operating the local light and power plant, is planning the erection of an addition to be equipped as an ice-manufacturing and refrigerating plant.

The Bogalusa Paper Co., Bogalusa, La., is planning the erection of an addition comprising five buildings, with machine department, 55 x 300 ft.; finishing department, 150 x 150 ft.; beater department, 95 x 140 ft.; operating room, 60 x 80 ft.; and power house, 25 x 65 ft. The structures will cost about $350,000, exclusive of machinery, the latter being estimated to bring the investment to more than $1,000,000. James L. Carey, 208 North Laramie Avenue, Chicago, paper mill engineer, will be in charge. A. C. Goodyear is president.

A manual training department will be installed in the

high school to be erected at Electra, Tex., for which a bond issue of $150,000 is being arranged. An architect will be selected to prepare plans.

H. W. Ralston, Anna Maria, Fla., is planning the construction of an electric light and power plant for service in the Anna Maria Beach section, estimated to cost $35,000.

The Andalusia Brick Co., River Falls, Ala., recently acquired by new interests, is planning for extensions and improvements, with the installation of additional machinery for increase in capacity. O. L. Benson, Andalusia, Ala., heads the company.

The South Texas Cold Storage & Warehouse Co., Houston, Tex., has plans for the erection of an eight-story ice and cold storage plant to occupy a city block on the north bank of the Buffalo Bayou, near the Main Street viaduct, estimated to cost $1,080,000, including machinery.

A manual training department will be installed in the high school to be erected at Lockhart, Tex., estimated to cost close to $100,000. C. H. Page & Brother, Austin, Tex., are architects.

The United States Engineer Office, Florence, Ala., will receive bids until Feb. 12 for one electric generator, 937.5 kva., capacity with exciter and auxiliary apparatus, for Sheffield, Ala., as per specifications on file.

The Board of City Development, Amarillo, Tex., is considering plans for extensions and improvements in the municipal water plant, to include the installation of electrically operated pumping machinery, valves, etc. E. S. Clegg, Santa Fe, N. M., engineer, is preparing plans.

Fire Jan. 14 destroyed a portion of the oil storage and distributing plant of the Magnolia Petroleum Co., Beaumont, Tex., with loss estimated in excess of $500,000. It is planned to rebuild.

The Great Southern Roofing Co., Mobile, Ala., recently organized with a capital of $125,000 has acquired a local building for the establishment of a new plant to manufacture roofing products. The structure will be remodeled and machinery installed at an early date. A power house will also be constructed. T. J. Larkin is president, and William D. Martin, secretary and treasurer.

Officials of the Carolina Oil Co., Nacodgoches, Tex., have organized the Yuba Refining Co., with paid up capital of $150,000, to take over the plant and business of the former organization. Extensions and improvements will be made in the refining plant and system. T. E. Baker is vice-president, and M. V. Wynne, treasurer.

The Common Council, Clarksville, Tex., will install electrically operated pumping machinery and other equipment in connection with extensions to the municipal waterworks, to comprise a complete new operating unit.

The Austin Petroleum Co., Inc., Austin, Tex., is planning for the installation of additional equipment at its refinery near Rockdale, Tex., to increase the output from 100 to 150 bbl. per day. S. A. Martin is president.

The St. Louis & Southwestern Railroad Co., St. Louis, is considering extensions and improvements in its car and locomotive shops at Tyler, Tex., to include the installation of additional machinery. The work will be carried out in connection with a general improvement program in 1923. W. S. Hanley is chief engineer.

The Pacific Coast

SAN FRANCISCO, Jan. 16.

THE United Autographic Register Co., 2316 West Forty-third Street, Chicago, will commence the erection of the first unit of a new plant at Union and Nineteenth Streets, Oakland, Cal., estimated to cost $50,000.

The Ford Motor Co., Seventh Street and Santa Fe Avenue, Los Angeles, will take bids at once for a two-story addition to its assembling plant, 132 x 350 ft. John Parkinson and Donald Parkinson, 420 Title Insurance Building, are associated architects.

The Libby, McNeill & Libby Co., Union Stock Yards, Chicago, has plans for the erection of a two-story addition at Loleta, Cal., for the manufacture of tin cans. It will be 75 x 160 ft., estimated to cost $50,000. Work will commence March 1.

The Oakdale and South San Joaquin Irrigation Districts, Oakdale, Cal., have plans for the construction of a joint electric power plant estimated to cost $1,516,000. Bonds are being arranged. R. E. Hartley is superintendent for the Oakdale district.

The San Gorgonia Power Co., Banning, Cal., operating in conjunction with the Southern Sierras Power Co., Riverside, Cal., has secured permission to construct two hydroelectric power plants in the vicinity of Banning, estimated to cost $500,000.

A manual training department will be installed in the new two-story high school to be erected at Sedro-Woolley, Wash., 180 x 260 ft., estimated to cost $150,000.

The Henry Mill & Timber Co., Tacoma, Wash., recently organized with a capital of $240,000, has acquired the local property of the former Tacoma Mill Co., and plans the early erection of a new mill and wood-working plant to cost $100,000, including machinery.

The Grangeville Electric Light & Power Co., Grangeville, Idaho, has secured a site on Bruce's Eddy and plans the construction of a new hydroelectric generating plant to cost $75,000.

The Henry Cowell Lime & Cement Co., 2 Market Street, San Francisco, is perfecting plans for a new plant at Tehachapi, near Bakersfield, Cal., estimated to cost $1,500,000. A power house will also be built.

The Standard Oil Co., 200 Bush Street, San Francisco, has preliminary plans for a new storage and distributing plant at the foot of Jones Street, with capacity of about 30,000 bbl., estimated to cost $75,000, including equipment.

The Western Sugar Refinery, 2 Pine Street, San Francisco, will commence the erection of a new one-story building to cost $250,000, including equipment. It is a subsidiary of the Spreckels Sugar Co., same address.

The California Salt Co., Mills Building, San Francisco, has tentative plans for rebuilding the portion of its plant on San Francisco Bay, destroyed by fire Jan. 14, with loss estimated at $300,000, including machinery.

William N. Voegtly, Jr., Merchants National Bank Building, San Francisco, is inquiring for open-side planers, bull riveters, vertical boring mills, quick acting punches, bending rolls, ¼-in. capacity, and a 10-ft. power bending brake.

The California Equipment & Supply Co., 205 North Los Angeles Street, Los Angeles, Cal., is in the market for a 1½ to 2-yd. steam or electric full swing shovel, 5-yd. dump cars, No. 5 to 10 gyratory crusher, four miles of 30-lb. rails, 30 to 50-ton gas or electric locomotive, also screens, conveyors, etc. The company will consider purchasing the entire rock and gravel plant of 1000-yd. per day capacity.

The Central South

ST. LOUIS, JAN. 22.

PLANS are being prepared by the Norton Iron Works, Inc., Ashland, Ky., for a one-story addition, 50 x 300 ft. The company recently increased its capital from $311,600 to $1,860,000 for expansion. T. M. Adams is president and general manager.

A manual training department will be installed in the two-story high school, 90 x 130 ft., to be erected at Montgomery Avenue and Thirty-second Street, Ashland, Ky., estimated to cost $100,000, for which bids will be asked this month. Tyson & Foster, Grand Theater Building, are architects.

The Central Power & Light Co., Chemical Building, St. Louis, is disposing of a bond issue of $3,000,000, a portion of the proceeds to be used for extensions and improvements in electric generating plants and system. The company operates in Missouri, Arkansas, Oklahoma and Texas.

The Common Council, Paris, Mo., will remodel the present municipal light and power plant, with the erection of a new building adjoining for the establishment of a city ice-manufacturing and cold storage plant, estimated to cost $35,000. W. B. Rollins & Co., 521 Railway Exchange Building, Kansas City, Mo., are engineers.

The Western Union Telegraph Co., 195 Broadway, New York, has awarded a contract to A. F. Hahn, Chattanooga, Tenn., for a new one-story machine and repair works on local site, 200 x 300 ft., estimated to cost $165,000, with machinery. It will be used for company equipment repairs, tool-making, etc.

The Consumers' Light & Power Co., Ardmore, Okla., has plans for a one and two-story power house to cost $100,000. The William A. Baehr Corporation, 122 South Michigan Avenue, Chicago, is engineer and manages the company.

B. F. Hayden and C. D. Cope, Springfield, Mo., are organizing a company to build a plant to manufacture brick and other kindred machinery. A site has been selected and plans are being drawn.

The Tennessee Lumber Co., Knoxville, Tenn., is planning the erection of a new lumber mill and wood-working plant, 75 x 165 ft., with adjoining structures, 75 x 125 ft., and 20 x 150 ft., with power house, 25 30 ft. The equipment installation is estimated to cost $35,000. J. W. Andes is president.

A vocational department will be installed in the four-story junior high school, 60 x 125 ft., to be erected at Winfield, Kan., estimated to cost $125,000. J. M. Fuller, Cowley Bank Building, is architect.

Fire Jan. 15 destroyed a portion of the five-story works of the Twin-City Tractor Co., 1320-22 West Twelfth Street, Kansas City, Mo., with loss reported at $40,000. It is planned to rebuild.

The Board of Trustees, Arkansas Boys' Industrial School, Pine Bluff, Ark., is planning the erection of a new industrial school.

The Carr-Trombly Mfg. Co., Second and Branch Streets, St. Louis, manufacturer of wood products, has plans for the erection of a three-story and basement addition, 130 x 220 ft., to cost approximately $60,000.

S. C. Walker, Smith Center, Kan., has completed plans for a new ice and cold storage plant, 48 x 100 ft., estimated to cost $50,000. A company will be organized to operate the works. W. E. Glover, Stormont Building, Topeka, Kan., is architect.

The Texas-Pacific Coal & Oil Co., Fort Worth, Tex., has acquired property at Wynnewood, Okla., and will commence the erection of a new refinery to cost $750,000. A machine shop will also be built.

The Hayes Equipment Co., 701 East Gilbert Street, Wichita, Kan., manufacturer of oil tanks and pumps for garage and other service, is completing plans for a new one-story plant, 80 x 230 ft., at Gilbert Street and Santa Fe Avenue, estimated to cost $175,000, including machinery. E. Forsblom, 405 Sedgwick Avenue, is architect.

A manual training department will be installed in the two-story high school to be erected at Sabetha, Kan., estimated to cost $100,000. An election to vote bonds will soon be held. T. W. Wilkinson, Central National Bank Building, Topeka, Kan., is architect.

The Watkins Mfg. Co., 1200 Riverside Street, Wichita, Kan., manufacturer of grain machinery and parts, will commence the erection of a new plant, two-stories, 50 x 150 ft., at 204 North Waco Street, to cost approximately $25,000. E. A. Watkins heads the company.

The Memphis Sash & Door Co., 673 South Dudley Avenue, Memphis, Tenn., is having plans drawn for an addition to cost $40,000. Jones & Furbinger, Porter Building, are architects.

A manual training department will be installed in the two-story high school to be erected at Greenville, Ky., estimated to cost $80,000. Joseph & Joseph, Francis Building, Louisville, are architects.

The Holston River Power Co., Knoxville, Tenn., has preliminary plans for a new hydroelectric power plant on the Holston River, vicinity of Kingsport. It will have an initial capacity of 75,000 kw.

Canada

TORONTO, Jan. 22.

QUIET but steady improvement continues a feature of this market. Demand for equipment is greater than that for the corresponding period a year ago and dealers report sales on the increase. Inquiries are more pronounced and the contracts recently closed by the Canadian National Railways for equipment are expected to bring out a stronger demand for machinery from concerns participating in the orders. The Canadian Locomotive Works, Kingston, Ont., is putting its plant into shape to commence operations on its recent order for 26 locomotives. It is expected that within the next six months an extensive buying movement will be created on new works account. A good demand for equipment for mining and for pulp and paper mills is also in prospect. Several large electrical developments are proposed for this year for which machinery will be purchased.

The town of Fredericton, N. B., proposes to make extensions and install additional equipment in its pumping plant. J. A. Reid is mayor.

The Glen Motors, Ltd., Toronto, is preparing to establish a one-story factory at Brantford, Ont.

It is stated that the St. Regis Paper Co. of Canada, Ltd., Montreal, will start work in the spring on the erection of pulp mill at Godbout, Que.

The Dominion Glass Co., Ltd., Toronto, is contemplating the erection of a large plant in Montreal.

The Industrial Lock Nut Co. of Canada, Windsor, Ont., has purchased a site in Toronto and will start work in the spring on the erection of a plant.

The National Brass & Aluminum Co., Toronto, will start work at once on an addition to its plant.

The Hollinger Consolidated Gold Mines, Timmins, Ont., propose to increase the present mill capacity and to develop hydroelectric power on the Abitibi River, the project to cost approximately $2,000,000.

It is stated that the McIntyre-Porcupine Mine, Schumacher, Ont., will increase the mill capacity from 750 to 1000 tons per day and install new equipment.

The city of Brandon, Man., is contemplating the erection of a power plant to cost about $1,000,000. A gas suction pressure producer plant is being considered.

Contract for the new assembling plant of the Ford Motor Co. of Canada, Toronto, has been awarded to Anglin Norcross, Ltd., and it is expected that it will be in operation within six months. The estimated cost of the project, including land and buildings, is $1,000,000. The contract calls for a one-story assembling building, 400 x 500 ft., and power house 50 x 120 ft. It is understood that the company will concentrate the greater part of the assembling of its products marketed in the central Ontario district in the new plant and as demand increases extensions will be made.

The Donna Cona Paper Co., Montreal, will spend $300,000 on improvements and enlargements to its plant. It is the intention to double the present capacity.

The Shawinigan Foundries, Shawinigan, Que., recently acquired by W. G. Dauncey, propose to begin work in the spring on the erection of a steel foundry. Since it started operations last October it has built a new foundry with new core rooms and ovens. Production at present consists of gray iron castings, special acid resisting and other alloys, as well as brass, bronze and aluminum castings, etc.

Water power development for the Shawinigan Water & Power Co., Montreal, at the Gres Falls and Gabelle Rapids on the St. Maurice River, will be undertaken by a subsidiary, the St. Maurice Power Co. Plans include the erection of a concrete dam 1547 ft. long about 10 miles below Shawinigan Falls. The power house will be constructed at one end of the dam and will be 115 x 440 ft. The installation will include four vertical type turbines and generators, each having a capacity of 30,000 hp. Room will be provided in the power house for two additional units. Work is expected to be completed within eighteen months.

The Longueil plant of Armstrong, Whitworth of Canada, Ltd., Montreal, has been reopened for the manufacture of pulp and paper machinery and to carry on general engineering work. It is reported that this plant will be operated as a Canadian branch of Charles Walmsley & Co., Bury, England, and will be turned over to a new concern, the Charles Walmsley Co. of Canada, Ltd. A Canadian board of directors is being established.

The Town Council, Fort Erie, Ont., will build an addition to the electric light plant to cost $10,000. A. E. Seaton is clerk.

Virginia Iron, Coal & Coke Co. Report

In its annual report the Virginia Iron, Coal & Coke Co., Roanoke, Va., shows a falling off in net earnings for the last quarter of 1922 as compared with the three-month period ending Sept. 30, 1922, but the figures are nevertheless greater than the combined net earnings of the first two quarters of the year. The statement of gross and net earnings for the fourth quarter and the entire year follow:

Gross earnings for the three months ended Dec. 31, 1922	$393,749.87
Less interest, taxes, etc.	120,565.72
Net earnings for the fourth quarter	$273,184.15
Net earnings for the third quarter	273,886.47
Net earnings for the second quarter	95,959.86
Total	$643,030.48
Net loss for the first quarter	81,047.27
Net earnings for the twelve months ended Dec. 31, 1922	$561,983.21

The Columbia Steel Corporation, recently organized to manufacture steel on the Pacific Coast, is offering through Dillon, Read & Co., New York, $4,000,000 15-year first mortgage 7 per cent sinking fund gold bonds to public subscription. According to W. E. Creed, president of the corporation, the Columbia Steel Co. during the last six years has shown average annual earnings of $564,066, after interest and depreciation.

The Globe Steel Tubes Co., Milwaukee, has opened a district sales office for the southeastern territory in Baltimore, Md., at 716 Continental Building. R. R. Lally, formerly with National Tube Co., has been appointed district sales agent.

Prices of Raw Materials, Semi-Finished and Finished Products

Iron Ore

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$5.95
Old range non-Bessemer, 51½ per cent iron	5.20
Mesabi Bessemer, 55 per cent iron	5.70
Mesabi non-Bessemer, 51½ per cent iron	5.05

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., 55 to 58 per cent iron in dry Spanish or Algerian	10.50c.
Iron ore, Swedish, aver. 66 per cent iron	9.5c. to 10c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus	29c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	27c.
Manganese ore, Brazilian	28.5c. to 29c.

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown

per gross ton

Rolling billets, 4-in. and over	$37.50 to $38.50
Rolling billets, 2-in. and under	37.50 to 39.50
Forging billets, ordinary carbons	43.00 to 45.00
Wire rods, common, soft base, No. 5	47.50 to 50.00
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon	$3 to $10 per ton over base
Wire rods, acid	$15 per ton over base
Sheet bars, Bessemer	$37.00 to 38.50
Sheet bars, open hearth	37.50 to 38.50
Slabs	37.50 to 38.50
Skelp, grooved, per lb	2.00c.
Skelp, sheared, per lb	2.00c.
Skelp, universal, per lb	2.00c.

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light new steel base, per lb	2.15c.
Rails, light, rerolled base, per lb	2.00c.
Spikes, 9/16-in. and larger, base, per 100 lb	$2.75 to $3.00
Spikes, ½-in. and smaller, base, per 100 lb	3.50
Track bolts, base, per 100 lb	3.75
Tie plates, per 100 lb	$2.35 to 2.50
Angle bars, per 100 lb	2.75
Bars, common iron, base, per lb	2.25c. to 2.50c.
Bars, rail steel reinforcing base, per lb	2.00c.
Ground shafting, base, per lb	2.90c.
Cut nails, base, per keg	$3.00

Automobile Sheets

Prime quality, subject to 15 per cent "seconds" arising. Prices based No. 22 gage Pittsburgh

Regular auto body quality	4.70c. to 5.00c.
Deep drawing auto body quality	4.95c. to 5.25c.
Extra deep drawing auto body quality	5.20c. to 5.50c.
Flat fender, hood, door and apron or splash guard stock	4.95c. to 5.25c.
Crown fender and cowl, deep drawing	5.20c. to 5.50c.
Crown fender, cowl and radiator casing, extra deep drawing	5.45c. to 5.75c.

Sheet Extras

Sheet steel extras for various finishes and qualities, to be added to base price of black sheets (O. P. C. R. & A.)

Bessemer refined	$0.25
Bessemer special	0.50
Blued elbow stock	0.25
Blued range steel	$0.70
Blued stove pipe stock, No. 25 ga. and lighter	0.20
Blued stove pipe stock, No. 24 ga. and heavier	0.50
Enameling stock	0.50
Full cold rolled japanning stock	0.25
Full cold rolled blued stove pipe stock	0.40
Full cold rolled blued stove stock	0.60
Full pickled, full cold-rolled and annealed	0.75
Locker stock	0.25
Special locker stock	0.70
Metallic furniture stock.	
Plus 5 per cent for resquaring	1.00
Nickel plating stock, oiled	1.50
Range steel	0.50
Single pickled	0.45
Extra box annealed	0.15
Deoxidizing	0.15
Circle shearing.	
16 gage and heavier	.30 per cent
17-19 gage	.35 per cent
20-21 gage	.40 per cent
Liming	$0.10
Oiling	0.10
Patent leveling	0.25
Resquaring	.5 per cent
Roller leveling	$0.10
Deep drawing	0.25
Extra deep drawing	0.50
Bow socket sheets	0.75
O. H. fender and hood	0.25
O. H. crown fender	0.50

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica per ton f.o.b. Illinois and Kentucky mines	$20.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica per ton, f.o.b. Illinois and Kentucky mines	21.50

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$43.00 to $46.00	$38.00 to $41.00
Ohio	40.00 to 42.00	35.00 to 38.00
Kentucky	40.00 to 42.00	37.00 to 40.00
Illinois	43.00 to 45.00	40.00 to 42.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton		5.50 to 8.00

Silica Brick:	
Pennsylvania	42.00
Chicago	47.00
Birmingham	48.00
Ground silica clay, per net ton	7.50 to 9.50
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00
Chrome Brick:	
Standard size, per net ton	50.00

IRON AND INDUSTRIAL STOCKS

Declines for the Week General—No Outstanding Developments

Comparison of week-end prices in steel and industrial stocks with those of the previous closing reveals a prevalence of net declines. Saturday ended in dullness and misgivings, a fitting close for a week of perplexities. Early-week reactions bore close relation to the European spectacle, which is watched intently; but there are other elements at work, as was revealed in the circulation of spurious letters designed to bring down Baldwin. There was a drop in the issue, but as soon as the ruse was sensed it reversed and reached 13⅜ on large volume. A few favored specialties were buoyed up on Wednesday's rally, which persisted through Friday, but the week as a whole was colorless. Chicago Pneumatic Tool, Hayes Wheel and Timken were in the stream moving upward. Pressed Steel Car dropped four points, foreshadowing a belief that dividends will be passed. Great precaution guards every movement. No outstanding factor can point what way to turn, though, admittedly, a settlement in the Ruhr would cause a sharp rally.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High
Allis-Chalm.	45½	46½
Allis-Chalm. pf.	96	..
Am. B. S. & Fdry.	72	73
Am. B. S. & F. pf.	106½	107½
American Can	80	85¼
American Can pf.	112¼	112⅝
Am. Car & Fdry.	178	183
Am. Car & F. pf.	124	125⅞
Am. Locomotive	120½	124¾
Am. Locomot'e pf.	120½	121
Am. Radiator	77	80
Am. Steel Fdries.	35½	36¾
Am. Steel Fdr. pf.	103½	..
Baldwin Loco.	129¼	136
Baldwin Loco. pf.	11[illegible]	..
Bethlehem Steel	59¾	60
Beth. Stl. Cl. B	60¼	63¾
Beth. Stl. 8% pf.	108	109½
Brier Hill	19	19¼
Br. Em. Steel	9	..
Br. Em. S. 2d pf.	25¼	..
Cambria Steel	40	..
Chic. Pneu. Tool	82⅝	88½
Colorado Fuel	25¼	26⅝
Crucible Steel	68½	73⅞
Crucible Steel pf.	90½	91½
Deere, pf.	73½	74
General Electric	179	183¼
Gt. No. Ore Cert.	30	30½
Gulf States Steel	79¼	84¾
Inland Steel	46	46½
Int. Har.	87¾	89¾
Int. Har. pf.	116	..
Lima Loco.	58⅜	60¾
Midvale Steel	27⅞	28½
Nat.-Acme	11¼	11½
Nat. E. & Stm.	66	69½
Nat. E. & Stm. pf.	100	100¼
N. Y. Air Brake	27¾	29¼
Otis Steel	8⅛	8⅜
Pittsburgh Stl. pf.	92	..
Pressed Stl. Car	65½	73¼
Pressed Steel pf.	88	92
Ry. Steel Spring	113	114½
Replogle Steel	26	28
Republic	47⅝	51⅜
Republic pf.	89½	92¾
Sloss	43⅞	50¾
Sloss pf.	71	83½
Steel of Canada	61	62½
Superior Steel	29½	31
Un. Alloy Steel	34	..
U. S. Pipe	30	32
U. S. Pipe pf.	70¼	71½
U. S. Steel	104½	107⅜
U. S. Steel pf.	122¼	123½
Vanadium Steel	35¼	37⅞
Va. I. C. & Coke	54	..
W'house Air Br.	107	109

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.19c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.19c.
Hoops, base price	5.04c.
Bands, base price	3.99c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.29c.
Channels, angles and tees under 3 in. x ¼ in., base	3.19c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.20c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.40c.
Toe-calk, ½ x ⅜ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.00c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.29c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c.	.....
Nos. 22 and 24	4.35c.	5.00c.
No. 26	4.40c.	5.05c.
No. 28	4.50c.	5.15c.
No. 30	4.75c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.35c. to 4.60c.
No. 16	4.50c. to 4.75c.
Nos. 18 and 20	4.65c. to 4.90c.
Nos. 22 and 24	4.80c. to 5.05c.
No. 26	4.95c. to 5.20c.
No. 27	5.10c. to 5.35c.
No. 28	5.25c. to 5.50c.
No. 30	5.75c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—50	—35	½ in. Butt	—11	+13
¾ in. Butt	—55	—42	¾ in. Butt	—17	— 1
1-3 in. Butt	—57	—44	1-1½ in. Butt	—20	— 2
2½-6 in. Lap	—54	—41	2 in. Lap	—14	+ 2
7-8 in. Lap	—50	—26	2½-6 in. Lap	—18	— 2
9-12 in. Lap	—46	—25	7-12 in. Lap	—10	+ 6

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	20 c. to 21 c.
High brass wire	20½c. to 21½c.
Brass rods	17¼c. to 18¼c.
Brass tube, brazed	27 c. to 28 c.
Brass tube, seamless	23½c. to 24 c.
Copper tube, seamless	26½c. to 26¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22½c. to 23½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb, advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
		80 lb.	$5.80	$5.55
		90 lb.	5.90	5.65
		100 lb.	6.00	5.75
IC. $10.00	$8.50	IC.	6.15	5.90
IX. 11.50	10.00	IX.	7.15	6.90
IXX. 13.00	11.25	IXX.	8.15	7.90
IXXX. 14.25	12.50	IXXX.	9.15	8.90
IXXXX. 16.00	14.00	IXXXX.	10.15	9.90

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits pig	41c.
Bar	47c. to 52c.

Copper

Lake ingot	16 c.
Electrolytic	15¾c.
Casting	15½c.

Spelter and Sheet Zinc

Western spelter	8½c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8¼c. to 9c.
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	29c.
No. 1 solder	27½c.
Refined solder	24½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	7½c. to 8¼c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	27c. to 28c.

Old Metals

Values are slightly lower and business is very quiet. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.50
Copper, heavy wire	12.00
Copper, light and bottoms	10.00
Brass, heavy	7.00
Brass, light	6.00
Heavy machine composition	9.50
No. 1 yellow brass turnings	7.00
No. 1 red brass or composition turnings	8.75
Lead, heavy	6.00
Lead, tea	4.50
Zinc	4.50